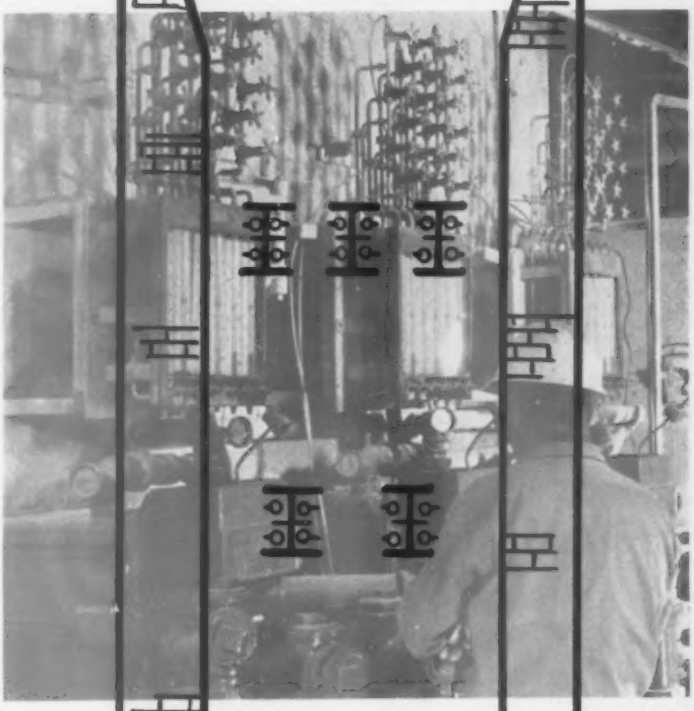
OCTOBER·1959

# ROCK PRODUCTS



**Ingenuity and research pay off for Union Carbide**
page 80

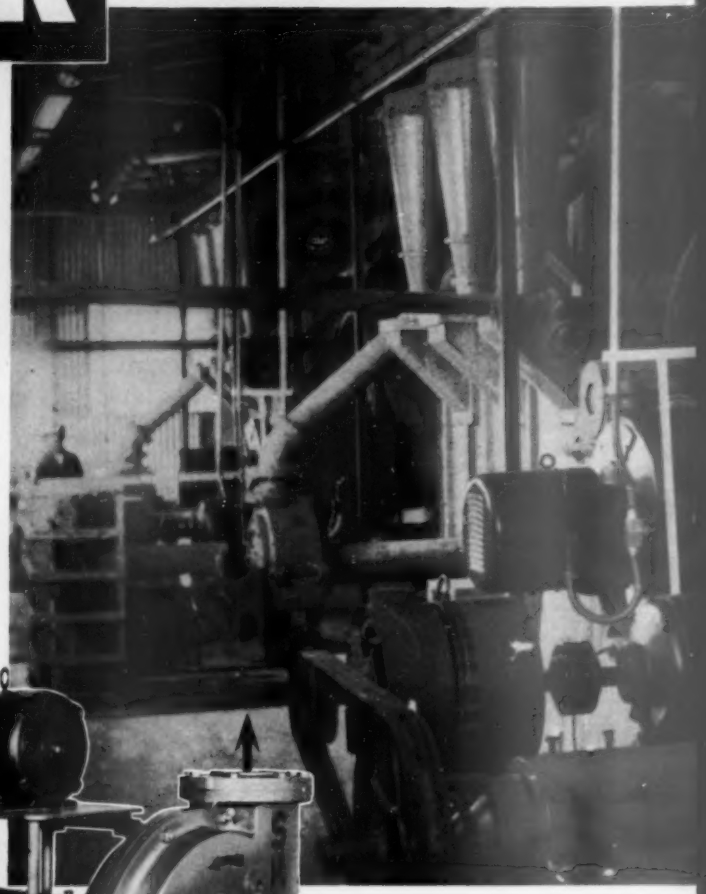
**Where do we stand on depreciation and percentage depletion** page 85

Upper burner beams of vertical lime kiln

# DENVER SRL PUMPS

## If You Use Cyclones...
## You Need DENVER SRL* Pumps

**Rubber-lined*



### *Constant, Uniform Volume of Feed*

Cyclone efficiency depends on uniform *pressure* to the cyclone. The "flat performance curve" of DENVER SRL Pumps will show you their ability to maintain a constant, uniform volume of feed with a minimum variation in *pressure*. And, speed can be adjusted easily to obtain correct *pressure* for each specific application.

### *High Efficiency—Long Part Life*

Wear causes loss of pump efficiency *and loss of pressure*. Accuracy of precision molded rubber parts and the superior wearing qualities of tough "dense" rubber used in DENVER SRL Pumps keep efficiency *high* over an extended period of service. High pumping efficiency also results in lower horsepower requirements.

### *Lower Parts Cost*

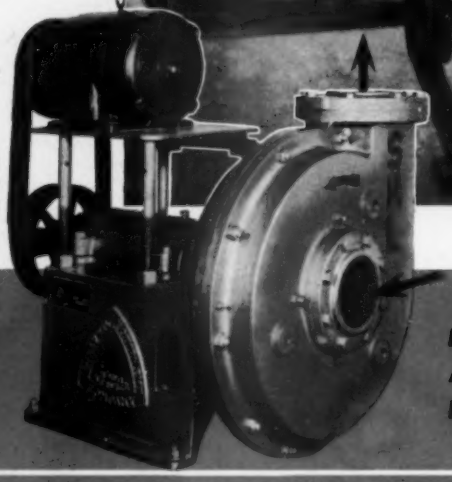
Parts cost less because they last much longer than those of other pumps.

### *Fast Service*

Parts are kept in stock... you don't need large parts inventory.

### *Positive Gland Seal*

Positive gland water seal protects shaft. Yet sealing water requirements are so *small* that changes in pulp density between pump feed and discharge cannot be measured.



**Send us details of your present or proposed operation for a complete report and recommendations on how DENVER SRL Pumps can improve your cyclone performance.**

**Sizes up to 3000 g.p.m.**

**DENVER SRL PUMPS ARE STANDARD FOR CYCLONE SERVICE**

*"The firm that makes its friends happier, healthier and wealthier"*

DECO ENGINEERED STANDARD RELIABLE 24 HOUR SERVICE EFFICIENT

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B.F.Goodrich

# This belt stands hot lime, has outlasted others 3 to 1

HOT lime, just dumped from the dryer, is on its way to a crusher via conveyor belt. But keeping this belt going used to be a problem. The high heat baked the rubber. Belts had to be repaired frequently; averaged only nine months' service before giving out entirely.

When a B.F.Goodrich distributor heard of the problem, he recommended a conveyor belt, called Solarflex, designed specifically for handling hot materials. This belt is made of a special rubber that stays soft and pliable at temperatures that cause other belts to harden, crack and finally break down.

The B.F.Goodrich Solarflex belt was installed, and after 27 months on the job is still going strong. Lime company officials say that the heat apparently hasn't bothered the belt, it is still as soft and pliable as when it was new. No repairs have been needed.

Instead of accepting the high cost of frequent replacements, this Ohio lime company made a smart move. They worked with a B.F.Goodrich distributor and got exactly what they needed to keep the plant running, cut maintenance costs, and get tripled belt life.

Your B.F.Goodrich distributor has full information on this hot-material conveyor belt. And, as a factory-trained specialist in rubber products, he can answer your questions about the many products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-717, Akron 18, Ohio.*

**B.F.Goodrich** ***industrial rubber products***

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# ROCK PRODUCTS

a Maclean-Hunter publication, Vol. 62, No. 10

October 1959



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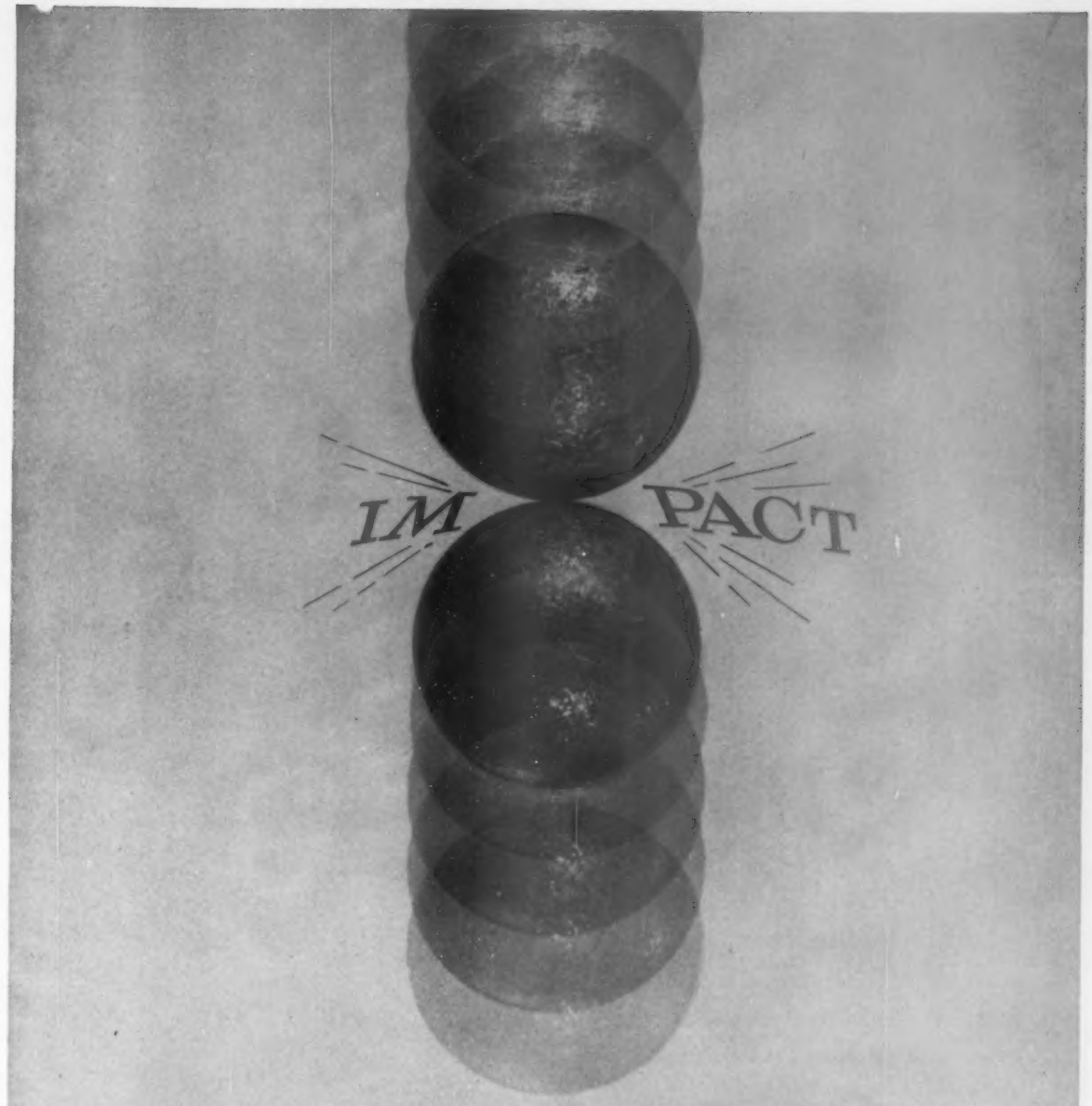


## MAKES DUST OUT OF MOUNTAINS

Coates Carbex Grinding Balls are made of fine-grained, high-carbon steel. They are especially forged to attain more perfect sphericity, then heat treated to extreme hardness, but with toughness to withstand the *IM PACT* of milling without shattering.

Coates Grinding Balls have been proven "best buys" in actual production run tests, yet Coates conducts a continuing research program to improve its already highly rated product.

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Write for prices . . . All sizes—½" to 5" carried in stock for immediate shipment.

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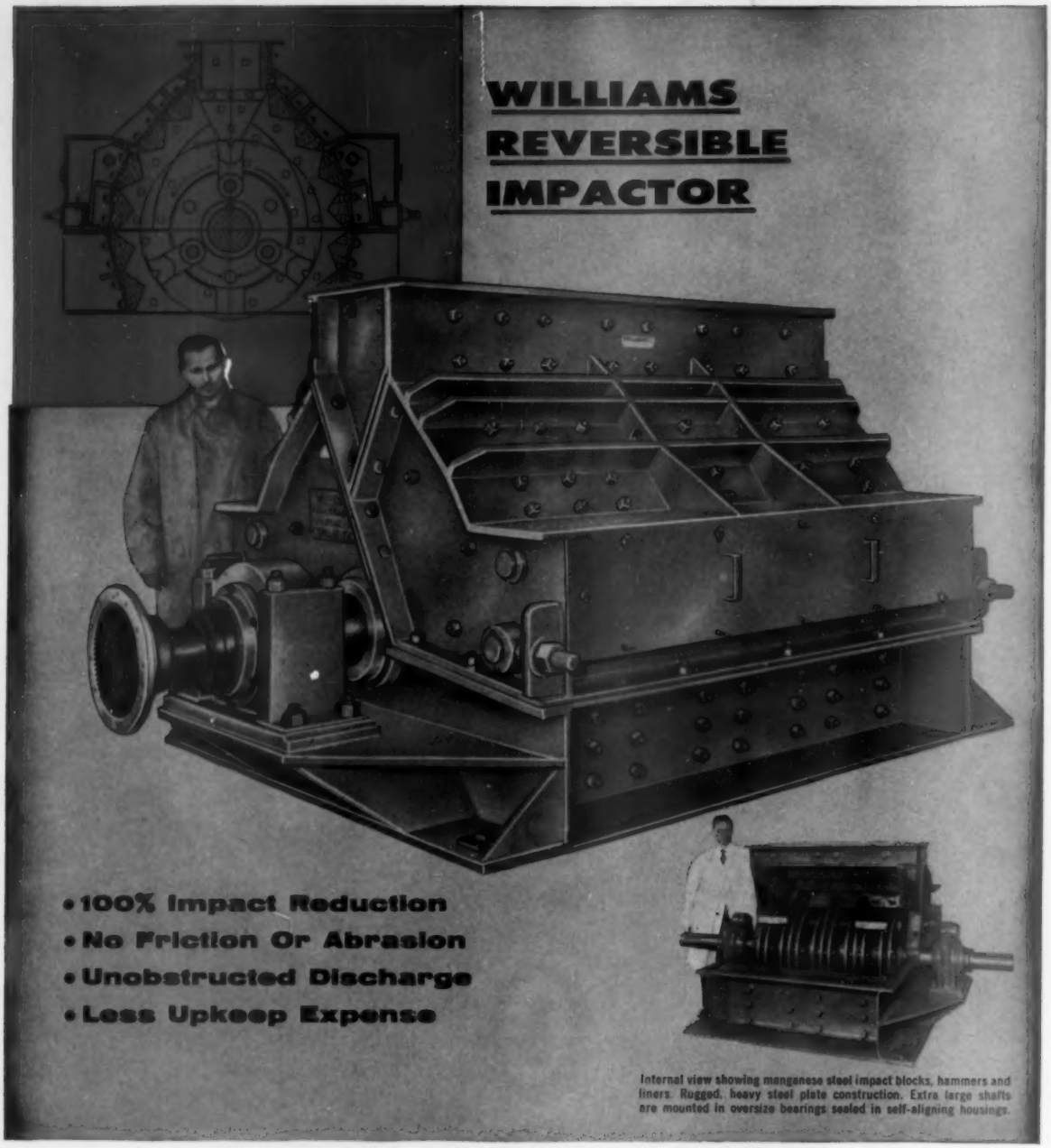
# WILLIAMS REVERSIBLE IMPACTOR



- 100% Impact Reduction
- No Friction Or Abrasion
- Unobstructed Discharge
- Less Upkeep Expense

Internal view showing manganese steel impact blocks, hammers and liners. Rugged, heavy steel plate construction. Extra large shafts are mounted in oversize bearings sealed in self-aligning housings.

## Unequalled For Secondary Grinding

Reduces limestone and material of similar hardness to 1½", ¾" or smaller. Properly adjusted, the Williams Impactor makes excellent material with the proper percentage of fines for road base course. Unusually low upkeep expense as reduction is 100% by impact. Material is fed to enter between the hammers and is thrown against the impact blocks setting up a repeated ricochet action which accomplishes the reduction. Adjustable impact blocks adjust for wear. A reversing switch on motor permits rotating hammers in either direction, to the left today and to the right tomorrow, thereby giving double hammer life. No grates are used. Entire bottom is open permitting unobstructed discharge of crushed material and less wear and tear. A size for every job. Let us tell you about one for your use.

**WILLIAMS PATENT CRUSHER & PULVERIZER CO.**
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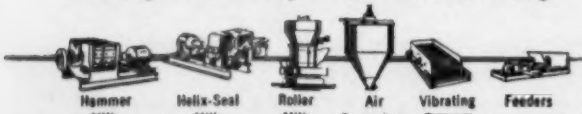


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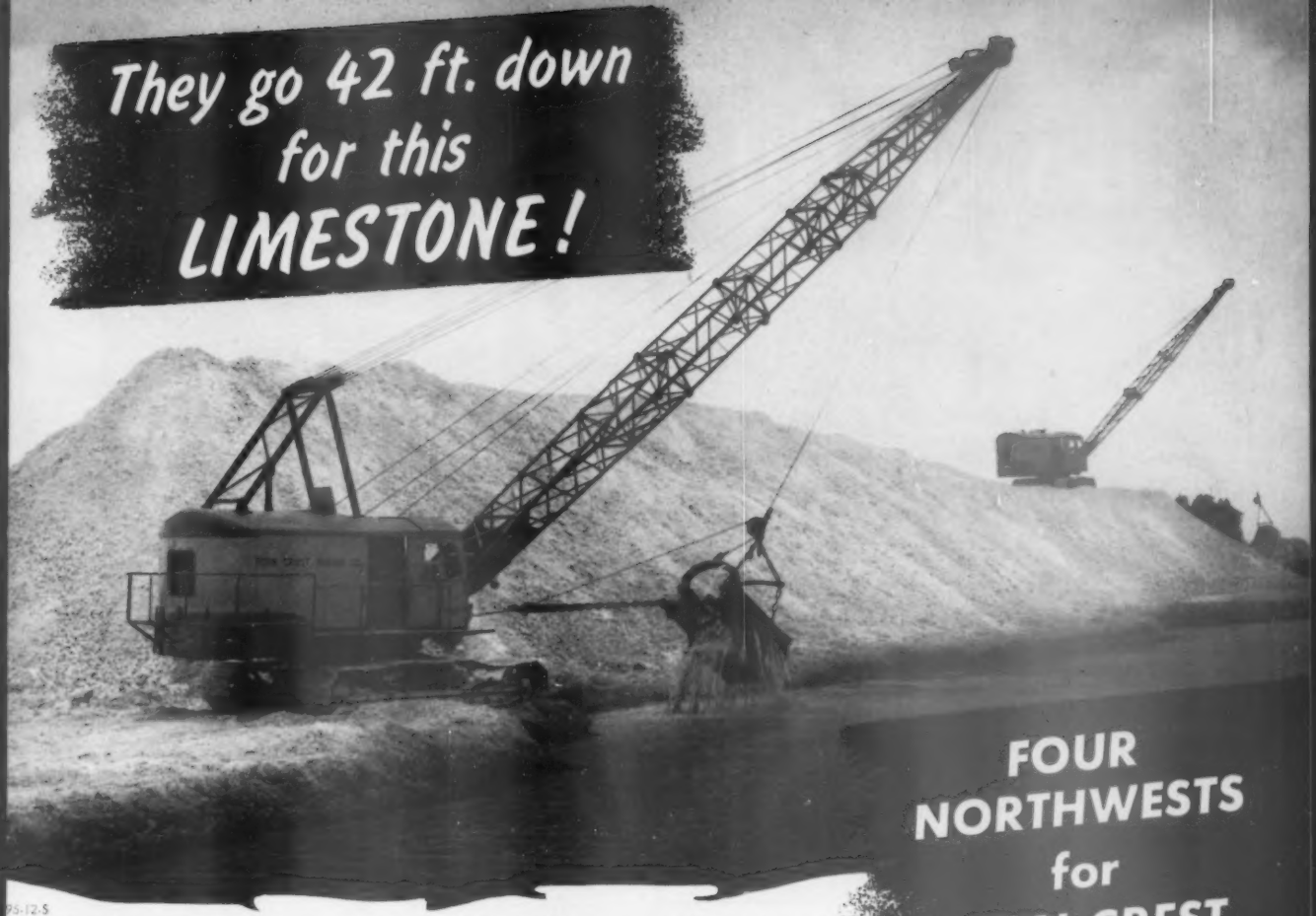
# They go 42 ft. down for this LIMESTONE!



## FOUR NORTHWESTS for FERN CREST MINING CO. Hollywood, Florida

95-12-S

This lime rock comes from 42 ft. down! Using 70-ft. booms and 2½-yd. buckets, two big Northwest 95 Draglines swing out the material to stock piles. From here, two Model 41 Draglines load to trucks or belt conveyors to feed the plant for processing. The job is at Hollywood, Florida where Fern Crest Mining Company is producing road stone.

These big Northwests are fast and they are always ready to go. *We hear it everywhere and Northwest users will tell you so.* Positive Traction on both crawlers, while turning as well as when going straight ahead, takes them where ordinary tractors have difficulty. They maneuver easily around bins and on stock piles. Uniform Pressure Swing Clutches, with their smooth operation and freedom from grabs and jerks, handle long booms necessary in a wet pit. The "Feather-Touch" Clutch Control brings the true feel of the load without resorting to pumps, compressors or other delicate mechanisms. Cast Steel Machinery Bases and Machinery Side Frames, the Cushion Clutch, and many other advantages have proved themselves profitable for gravel, sand and stone producers.

If you are planning on new equipment of this type, be sure to get the up-to-date story on the size machine you need.

**NORTHWEST ENGINEERING COMPANY**
1514 Field Building—135 South La Salle Street, Chicago 3, Illinois

### Ask about the NORTHWEST 25-D ¾-yd!

Be sure to find out about the 25-D and the 25-D 18-ton Lifting Crane — New Independent Worm Boom Hoist, True Power Load Lowering, Longer, Wider Crawlers, Larger Drums and Greater Cable Capacity, Larger Drum Brakes and Clutches and many other advantages.

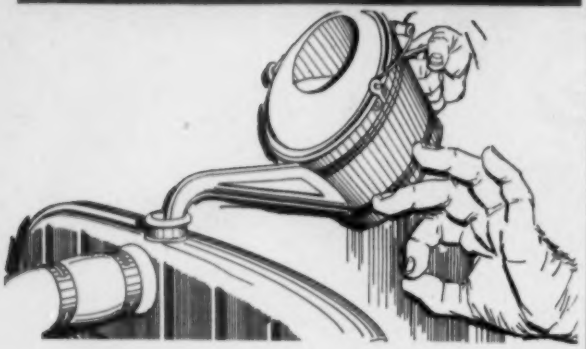
# NORTHWEST

*Always Ready to* GO

**NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES**

| SHOVELS | CRANES | DRAGLINES | PULLSHOVELS | TRUCK CRANES |
|---|---|---|---|---|
| ¾ Yd. to 2½ Yd. Capacity | 13-Ton to 60-Ton Capacity | ¾ Yd. to 3 Yd. Capacity | ¾ Yd. to 2½ Yd. Capacity | 25-Ton to 35-Ton Capacity |

# LUBE LOGIC



## NEW WAY TO KEEP RUST OUT OF YOUR RADIATOR

Rust in your cooling system can start damaging your engine long before your radiator blows its top. It will slow up water circulation, which will raise engine temperature, which will raise havoc with engine performance. Don't let it start. A little Texaco Soluble Oil C in your radiator and your troubles are over. Your TAE* can give you the details.

## EASY WAY TO AVOID BATTERY DEPOSITS

Don't let battery deposits climb up your cables; you may want to get them off someday. Easiest way to keep this from happening: paint battery terminals with Texaco Rustproof L. One application will keep them deposit-free for months.

# Four ways to lighten your load this month

## HOW TO AVOID THAT FROZEN BOLT

Ever spend six hours fighting a U-bolt that's decided to corrode itself tight? We've seen it happen, and it's an unforgettable experience—especially when we told them they could have ducked all that trouble for the price of a pack of gum. When they let us back in, we showed them how just a dash of Texaco Threadtex could keep their bolt rust-free permanently. Ask your TAE* for a demonstration.

## *TEXACO AUTOMOTIVE ENGINEERS

Every month or so we'll bring you a batch of "sleepers"—little angles, so easy to overlook, where big savings in time and money can be made. But month in, month out, your local Texaco Automotive Engineer is the best source of money-saving lubrication ideas. Don't forget that "lubrication is a major factor in cost control." Texaco Inc., 135 East 42nd Street, New York 17, N. Y.

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Traylor Ball Mills feature shell liners of manganese or high carbon steel in plain, wave, cascade, lifter or Lorain types with shells of welded steel construction. Trunions are cast integrally with the detachable heads. Main bearings are made of Meehanite* metal, larger sizes fitted with a high-pressure Alemite pump. Driving gears are steel, precision-cut on our Maag gear generator. Write for Bulletin No. 11-121 today!

*Traylor Grinding Mills are available in Ball, Rod, Compartment and Tube Mills.*

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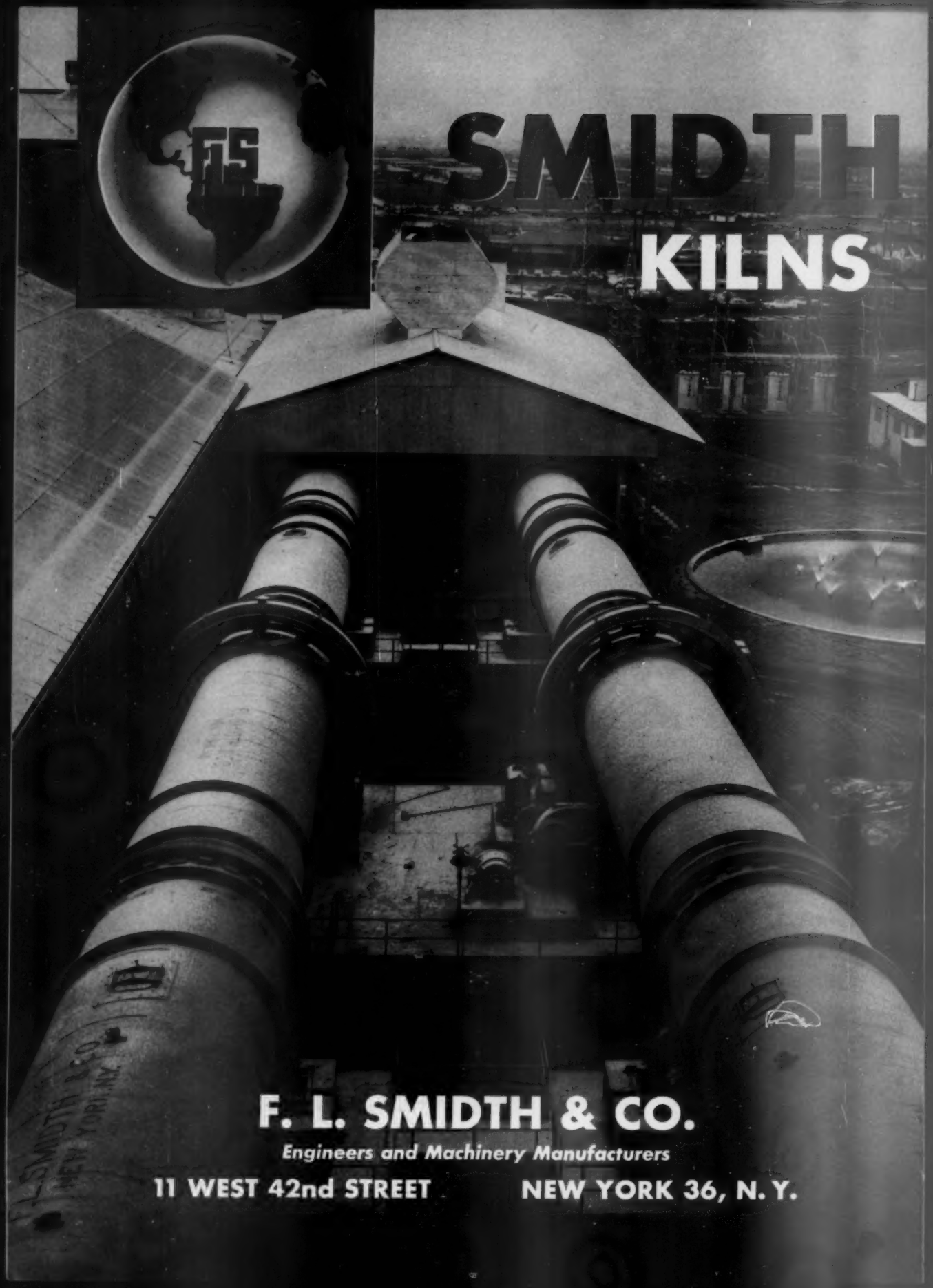
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# WHAT'S HAPPENING

## IN OTHER FIELDS OF INTEREST TO THE ROCK PRODUCTS INDUSTRY

October, 1959

**Traffic messages beamed to moving cars will be practical** in the near future. That is, if the Hy-Com system developed at the General Motors Technical Center works out as well as expected. Each car or truck equipped with a transistorized receiver and a special antenna will be able to pick up traffic instructions and safety information. With the transistors, the radio would not need to be turned on to receive the high intensity signal sent out by batteries of closely spaced roadside transmitters. Car speed, direction and traffic density would have little effect on the reception.

**The electron tube is going strong,** in spite of sweeping advances in transistors. Most recent advance in electron tubes is the "cold" cathode which glows intense blue in contrast to the familiar red-hot tube in radios and television sets. Still in the laboratory stage, the new tube shows promise of greatly improved efficiency, superior reliability and lower power requirements. In addition, it seems to be immune to extremes of temperature and unaffected by most kinds of radiation. Basic element in the device is a nickel tube coated with a thin layer of porous magnesium oxide enclosed in a conventional vacuum chamber.

**Textiles for extreme temperatures have been developed.** A major breakthrough in ceramic technology has revealed the technique of spinning ceramics into fine filaments. While any ceramic material may be processed in this way, the most successful work has been with zirconium oxide. First industrial application of the process will probably be to make insulation batts for insulation to protect instruments from exposure to temperatures ranging up to 4,500 deg. F. The material is available for weaving, spinning, felting or as reinforcing for high temperature plastics.

**A little smoke may be good for you,** especially if you live in smoggy cities or near sources of industrial air pollution. Canadian biologists believe now that smoke may suppress or dilute the effects of toxic fumes discharged into the air near refineries, chemical plants and steel mills.

**Don't count out coal as a versatile industrial mineral.** Laboratory investigations have found that coal itself can be used as an aggregate for flexible paving. One promising process indicates that as much as 1,000 tons of coal will be needed to make a mile of highway. This involves dissolving coal in low-temperature coal tar. A number of test roads have been put down for all-season testing in several parts of the country using several different processes and materials.

**Florida's mountains will be put to good use again.** The mountains are the immense piles of hitherto barren phosphate rock tailings which dot the landscape in west central Florida. Virginia-Carolina Chemical Co. has made the first experimental planting of about 12 acres of citrus trees on the leveled tops of several mounds, with Bermuda grass on the steep slopes. If the experiment succeeds it will open up a vast new area for fruit tree production and eliminate a number of unsightly waste heaps.

**More power from underground coal** is the objective of researchers in Great Britain. A number of projects involve injecting oxygen or steam into thin coal seams and processing the gaseous products. However, efficiency of these methods seems to decline with thin seams. The National Coal Board has worked out a method burning the coal in place which does not depend on thickness or richness of the seam to work effectively. Once the seam is ignited, combustion is controlled by air blown into the mine. The products of combustion are brought out in vents and piped to furnaces where they are burned to generate steam.

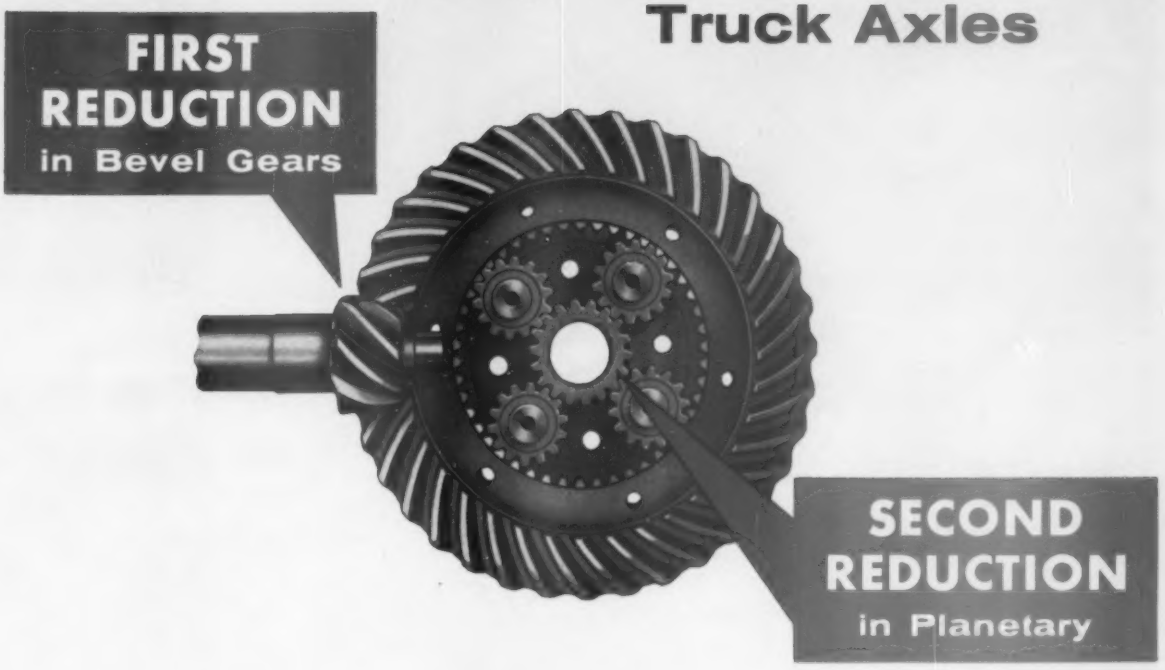
**"Every foxhole a home"** could well be the motto of the infantryman if the Army Test Center approves the use of a foamed plastic. In field tests, man-deep foxholes were quickly sprayed with a foamed plastic which set to form a waterproof lining. Using plastic sheets, a roof was readily formed which would support a man and prevent water seepage. While the natural plastic is white, it could be dyed to match the ground. Each company would have batch mixers which could turn out enough foam to make each man feel at home after he digs in.

**Wastes from nuclear power reactors can be fused into glass,** according to a Canadian scientist. Of all the ingenious methods for disposing of lethal radioactive spent fission products, few have shown as much promise. Basic material for the newly developed technique at Canada's atomic center at Chalk River is nephelene syenite, a complex glass-making chemical found in abundance in Ontario. A mixture of lime and reactor wastes is reacted with nephelene pellets in stages, forming glass blocks during the final stages of heating to 1,350 deg. C. and annealing. Prime advantages of this process are the low cost of the raw materials and processing, and the exceptional ability of the finished block to resist deterioration and release of highly active radioactive materials.

**Aggregate preparation without crushers may be closer than we think.** A recently patented process (U.S. 2,859,952) describes a technique of internal fracture induced by thermo-electric shock which can break taconite. Since the tensile strength of taconite is about three percent of its compressive strength, power requirements for tensile fracture are much less than for compressive crushing. Tensile fracture is achieved by passing material through or between high-frequency coils, followed by light impact to actually separate the fragments already cracked internally.

**The Editors**

# A New Concept in Double Reduction Truck Axles




# Eaton Planetary Double Reduction

*Gives You these Important Benefits!*

**Save Weight**—Size for size, Eaton PDR Axles weigh less than conventional herringbone or spur gear axles, permit truckers to haul more legal payload.

**Last Longer**—In Eaton PDR Axles, gear tooth loads are equally distributed over four rugged "planet" gears; stress and wear are reduced, resulting in materially longer axle life. Eaton's forced-flow lubricating system provides positive lubrication to all moving parts, even at slowest vehicle speeds—a feature not available in other double reduction axles.

**Cost Less to Maintain**

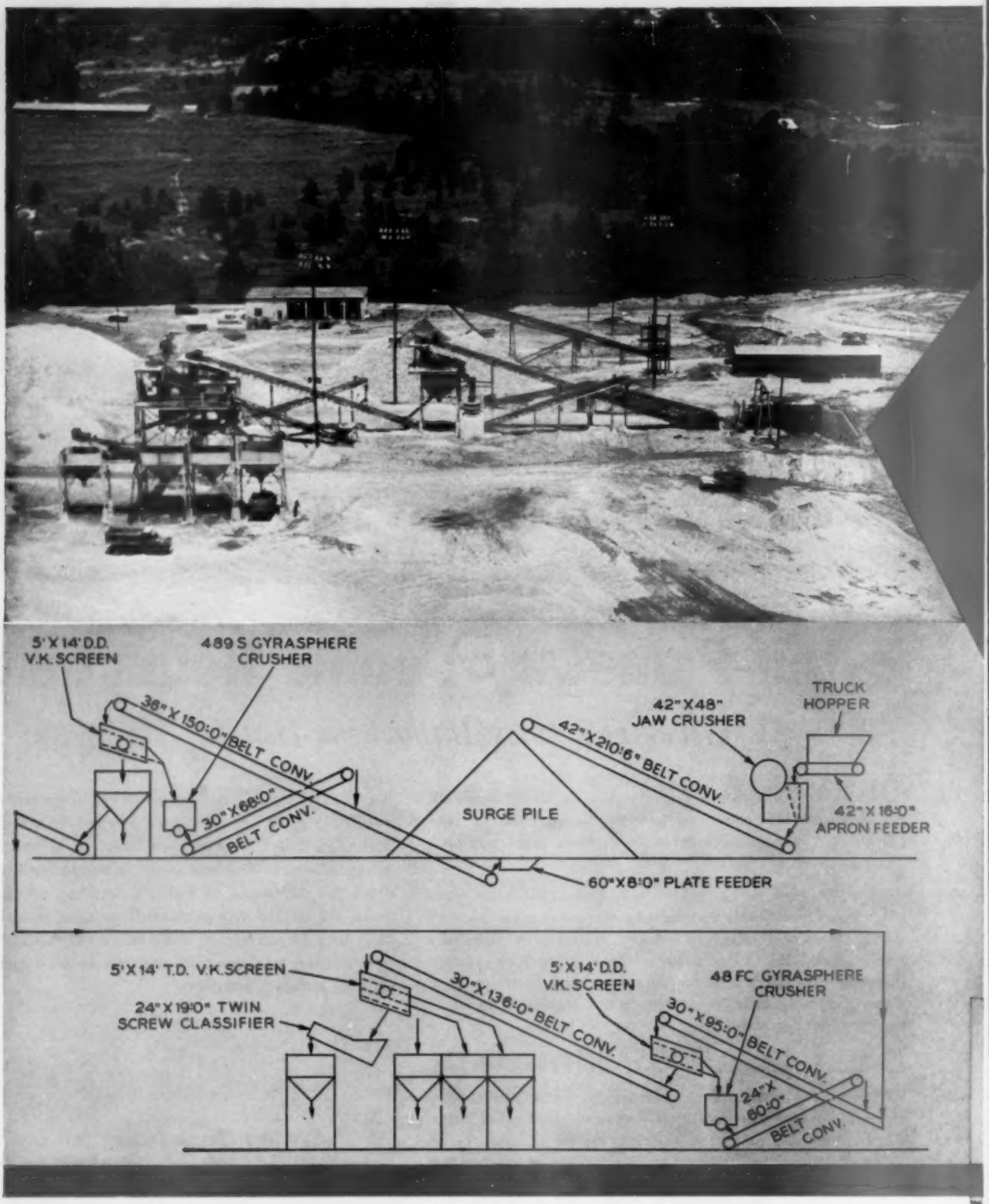
—When and if repairs are necessary, parts are readily available—most of them interchangeable with other Eaton Axles. Simple construction—similar to the famous Eaton 2-Speed Axle, with which all truck service men are familiar—holds maintenance labor to a minimum.

Previously, double-reduction axles have been available only in the extra heavy-duty sizes. Eaton PDR Axles are available in a wide range of sizes—the last word in equipment to meet the demands of today's hauling conditions. By actual comparison they cost less to buy, less to maintain. They have established outstanding performance records in all types of heavy-duty operation.

EATON

*Ask your Truck Dealer for Complete Information about Eaton PDR Axles*

**EATON** AXLE DIVISION MANUFACTURING COMPANY
CLEVELAND, OHIO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489 S GYRASPHERE CRUSHER
36" X 150'-0" BELT CONV.
30" X 66'-0" BELT CONV.
SURGE PILE
42" X 48" JAW CRUSHER
42" X 210'-6" BELT CONV.
TRUCK HOPPER
42" X 16'-0" APRON FEEDER
60" X 8'-0" PLATE FEEDER
5' X 14' T.D. V.K. SCREEN
24" X 19'-0" TWIN SCREW CLASSIFIER
30" X 136'-0" BELT CONV.
5' X 14' D.D. V.K. SCREEN
48 FC GYRASPHERE CRUSHER
30" X 95'-0" BELT CONV.
24" X 60'-0" BELT CONV.

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*designed* **and** *equipped*

**GAINESVILLE STONE CO. plant**
**Gainesville, Georgia**

**Owned by JOHN RUTH and WALLACE MORGAN**

PRIMARY CRUSHING PLANT — **Telsmith 42" x 48" Roller Bearing Jaw Crusher,** with **Telsmith 42" x 16' Heavy Duty Apron Feeder,** delivers 300-400 tons hourly of minus 7" material to the surge pile. Send for Bulletin 280 describing this new, big capacity jaw crusher with welded steel frame.

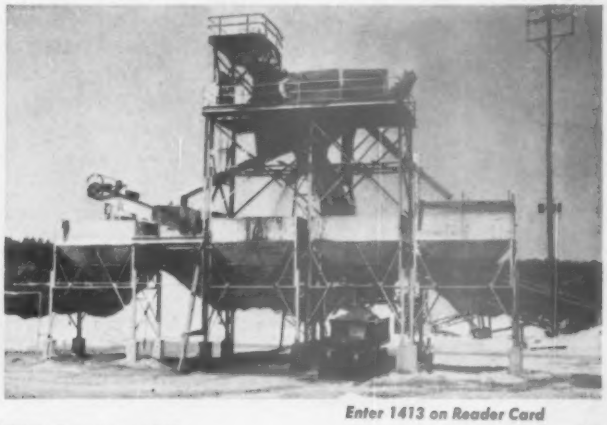
FINISHING PLANT— **All Telsmith equipped—** makes 200-225 tons hourly of minus 1¼" material. Minus 1¼" plus ¾", minus ¾" plus 4 mesh, minus 4 mesh are typical sizes Other sizes are made by changing screen cloth.

Primary Plant works 10 hours a day. The Finishing Plant works 16 hours a day, producing 3 or 4 sizes for use in batch plants and for county and state highway construction. Send for Bulletin 266 describing Telsmith Complete Plant equipment.

Telsmith 5' x 14' Double Deck Vibro-King Screen and 489-S Gyrasphere Crusher.

Telsmith 5' x 14' Triple Deck Vibro-King Screen and 24" x 19' Twin Screw Classifier.

Q-36



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# EDITORIAL

by GEORGE C. LINDSAY

## Government raps labor's knuckles

### . . . but operators have responsibilities, too

THE NEW LABOR REFORM LAW restricts racketeering and corruption in labor union affairs. This is as it should be, since those methods are contrary to good democratic principles in whatever place they may be found.

Just as important in the new law is the result of Congress' effort to improve labor-management relations. And this can be helpful to you as operators, to employes who are union members and to the public.

No doubt, effectiveness of some of the new law's provisions will be determined in the future by interpretation through court action. This is the normal procedure. But it especially may be true because reports already are out that labor is alarmed and frightened at the unexpected turn Congress took in putting together the new bill.

Frankly, labor leaders didn't expect such treatment from members on the Hill who, labor boasted, they helped to put there in past elections. They're sure to fight back. It's reported that they are girding themselves for "massed union power," which they hope to use in defense of what they call management's united front.

Too bad. That kind of thinking got them in hot water before. An attitude such as that just isn't designed for labor peace. And that, simply, is what we're trying to get.

There's another important aspect to the new bill; it was reported recently in the Wall Street Journal. The new law ". . . may have handed the Government," cautioned the report, "far more power to deal with union corruption than anyone has suspected." Some seasoned labor lawyers believe that the Secretary of Labor now may have even more investigatory power than the Senate's McClellan Committee held.

If this authority is fully realized by the Labor Secretary, the Journal said, it may be one of the most potent weapons against union crooks and crooked unions.

But the new labor law does more than take corrective action against racketeers. It provides for more democratic operation of unions, handling of union funds, and gives some needed rights to union members. It limits picketing practices, "hot cargo" contracts and threatened boycotts to some extent. Construction and garment industries are exceptions.

It also takes care of the "no man's land" area; State courts or agencies now can handle your labor disputes if you're a firm too small to qualify for relief from the National Labor Relations Board.

But you as an employer were not forgotten by Congress, either. You also have responsibilities, under the new law, for your own labor practices.

Get a copy of the new law and read it. Use it conscientiously in striving to improve labor-management relations and the bargaining procedure. Remember that you have a duty to the public and to your stockholders to stop costly and wasteful plant stoppages caused by labor troubles.



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## WHYTE STRAND
## Wire Rope is made for a purpose...

To give you the right rope for your equipment, each Whyte Strand wire rope is internally lubricated and designed to provide the right combination of toughness, flexibility, and abrasion resistance to assure maximum service.

Because Macwhyte manufactures a thousand and one wire ropes, you can be sure of getting just the right rope for each piece of your equipment.

You get quick delivery, too, from conveniently located Macwhyte distributors' stocks. For best results, ask for recommendations for the correct wire rope to use on your equipment!

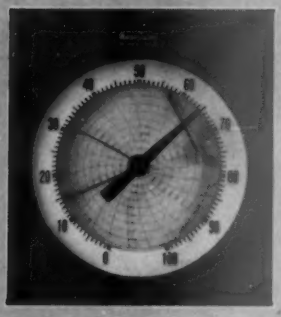
# MACWHYTE Wire Rope

*Wire Rope made for a purpose—to serve you better*

**Manufacturers of cableway excavator rope, shovel and dragline rope, haulage rope, derrick rope, scraper and dozer rope.**

168

◀ TRAVELING ALONG KILN SHELL on steel cable, the *Radiamatic* unit provides continuous temperature measurement.



*ElectroniK* CIRCULAR CHART RECORDER records kiln shell temperatures and reference points showing position of *Radiamatic* along kiln.

*RADIAMATIC* RADIATION DETECTOR responds to 98 per cent of any temperature change within two seconds, is automatically compensated for ambient temperatures up to 250°F.

# Guard Against Kiln Hot Spots

You can detect potential hot spots with a Honeywell *Radiamatic* radiation detector scanning the kiln shell the length of the hot zone. The *Radiamatic* unit works in conjunction with an *ElectroniK* circular chart recorder which records both temperatures and reference points showing the position of the detector along the kiln. When the temperature reaches a preset limit, a light flashes, warning the burnerman that a potential hot spot is developing.

Your nearby Honeywell field engineer can give you complete details of the system most applicable to your kiln. Call him today...he's as near as your phone.

MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.

# Honeywell

First in Control

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# NEW CONVEYOR DESIGN

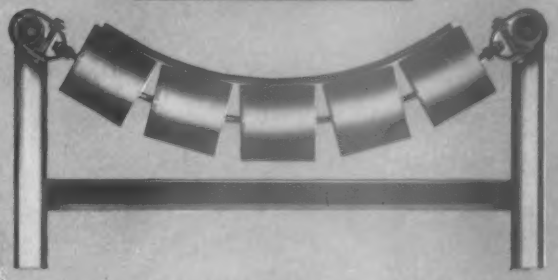
(EXCLUSIVE WITH McNALLY PITTSBURG)

## ...means far longer belt life!
## ...slashes maintenance costs!

**SECRET**

. . . of the improved efficiency of this new belt conveyor. This new McNally Pittsburg Cradle Idler* consists of 5" rubber rollers assembled on precision ball bearings, prelubricated, lifetime sealed. Being a *true catenary* suspension with rollers mounted on flexible, *non-rotating*, stainless steel wire rope, this design eliminates "loping" and harmonics.

**RESULT**



. . . is greater capacity and faster belt operation with minimum spillage. Since the belt lies in true arc with no creases or bends to cause wear, *belt life is substantially increased*. Because this unique McNally Pittsburg conveyor design is so simple, maintenance costs are lower; over-all erection time is reduced to a minimum as well.

**For do-it-yourself construction,** the entire conveyor is shipped disassembled and may be put together in the field to fit your conveyor needs. Also, a new "SHORTY" conveyor is available, only 2 feet high, ideally suited for use in limited working areas, above or below ground.

**Write today** for full details and information on this new, remarkably efficient, McNally Pittsburg Conveyor. Its new design cuts installation costs—and saves you money on belts and maintenance.

*Patents Pending

**McNALLY PITTSBURG**

McNally Pittsburg Manufacturing Corporation—Manufacturing Plants: Pittsburg, Kansas • Wellston, Ohio
Engineering and Sales Offices: Pittsburgh • Chicago
Rio de Janeiro • Pittsburg, Kansas • Wellston, Ohio

*Write Today*

McNally Pittsburg Mfg. Corp.
Dept. R.P.
Pittsburg, Kansas

☐ Please send information on the new McNally Pittsburg Belt Conveyor.

☐ Have Sales Engineer call for further consultation.

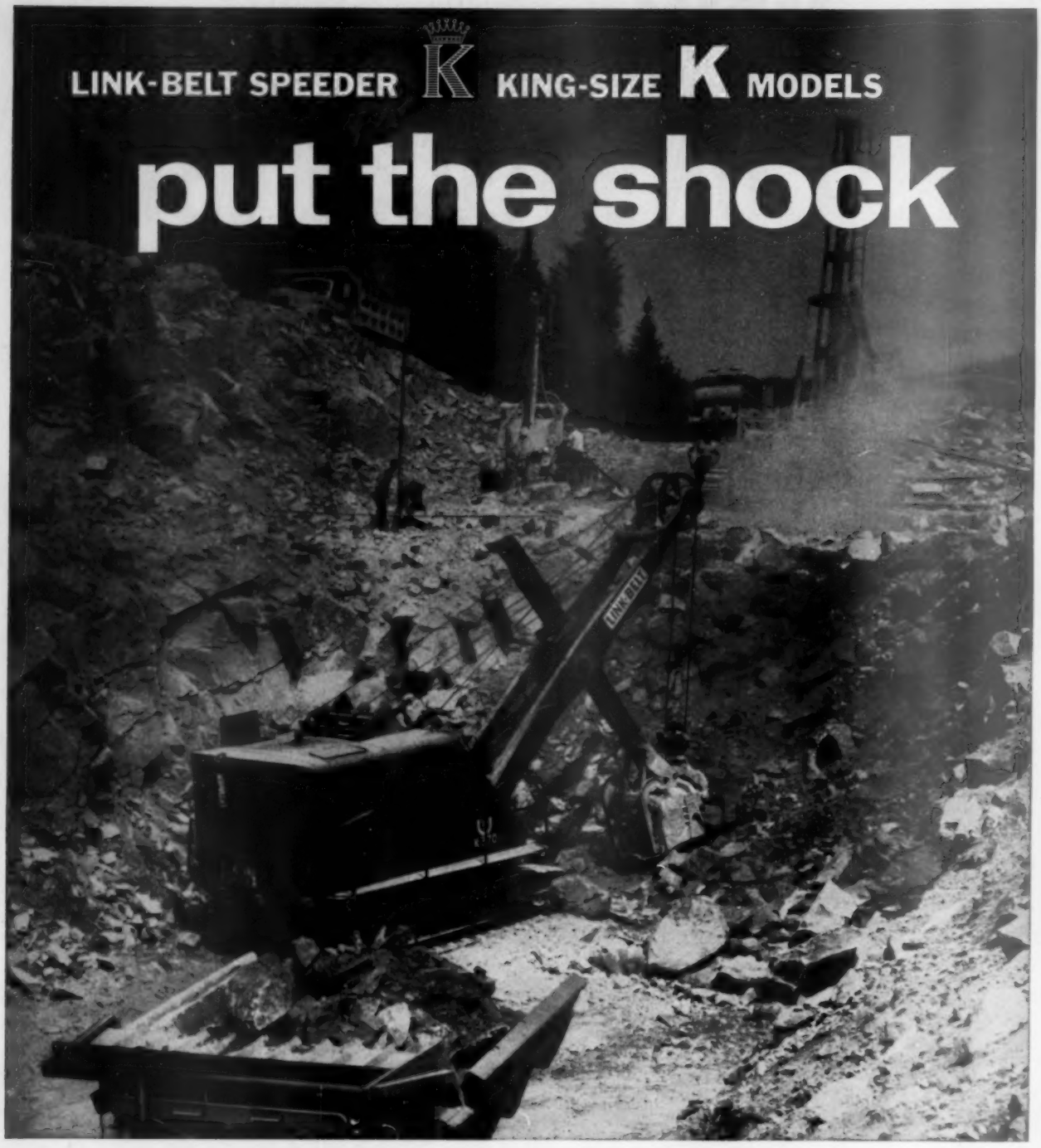
NAME _____ TITLE _____

COMPANY _____

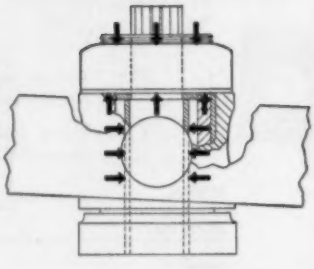
CITY _____ STATE _____

LINK-BELT SPEEDER K KING-SIZE K MODELS

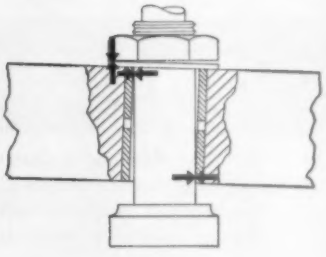
# put the shock



**THIS**—Link-Belt Speeder rotating base is trunnioned to the centerpin. Despite tilting action of the upper, there's perfect alignment of the centerpin and the bushing, plus full-length distribution of loadings to minimize stress and wear on centerpin.



**NOT THIS**—Without exclusive centerpin trunnion, tilting action of the base causes concentrated bending forces on the centerpin and prying action on the centerpin nut. Result is gouged centerpin bushing when swinging . . . repeated repairs.



# in the rock...

## *come back for more!*

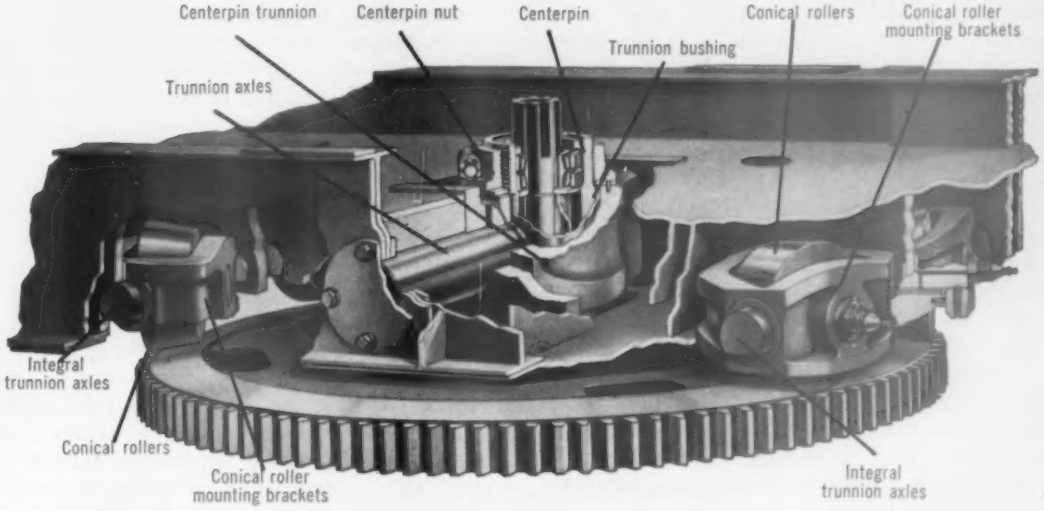
**TOUGH CUTS OR BRUTE LIFTS, BURLY 1½ TO 3-YD. K-MODELS OUT-MANEUVER SMALLER RIGS . . . OUT-PRODUCE LARGER MACHINES!**

Always on top of the heavyweight jobs! Your operator in the cab of a Link-Belt Speeder King-size K-model *knows* he need *never* baby this machine!

He feels the smooth surge of greater *usable* hp through hefty, extra-size shafts, gears and clutches. He socks the dipper in—rugged K-model structural members soak up the shock.

And K-models deliver these output-boosting advantages: Speed-o-Matic, the *true* power hydraulic controls . . . fast, effortless power hydraulic steer . . . *plus* bonus usable hp.

If you'd like more facts demonstrating how King-size K-models (1½ to 3-yd. capacity) outstrip the field, see your distributor or write Link-Belt Speeder Corporation, Cedar Rapids, Iowa.




**Exclusive centerpin trunnion and oscillating roller design evenly distributes all loadings**

**The centerpin trunnion** is mounted on two stub axles within the upper frame, permitting the upper to oscillate without any of the binding stresses common to other centerpin arrangements. All loadings are thus equalized with no prying action against the centerpin nut or bending stresses against centerpin and its bushing. Working hand in hand with centerpin design principle are the oscillating conical rollers. They are mounted within brackets that oscillate on stub axles, permitting full face contact of rollers with roller path at all times . . . no peening of roller edges or gouging of roller path. 10,291

**LINK-BELT SPEEDER**

***It's time to compare . . . with Link-Belt Speeder***

*Enter 1410 on Reader Card*

# ROCKY'S NOTES

by NATHAN C. ROCKWOOD

## A veritable encyclopedia on ready-mixed concrete

MOST OF THIS IS INTENDED TO BE A PREFACE or introduction to a book about to be published comprising a compilation of the series of articles on the ready-mixed concrete industry by James A. Nicholson, president of the Nicholson Concrete Co., Toledo, Ohio. These articles have been published serially in CONCRETE PRODUCTS during the last several years. While we expect some or most of what we write here will be used by the editor for the purpose intended, we cannot resist using this space to review and comment on this truly remarkable piece of work.

Like many others who receive our journal regularly, we have noted, and at least read cursorily, these various articles as they appeared, but we did not appreciate their whole value and significance as an authoritative and complete textbook on this new and rapidly expanding industry. With page proofs of the entire book before us, we are moved by admiration for the thoroughness, clarity and philosophy displayed in the writing of this work.

It is not often that a successful business executive in any industry finds the time, inclination, or has the requisite ability to become a notable writer or author. One wonders what inducement moves so busy a man to do it. In this case we think we have the answer, for Mr. Nicholson once told your reviewer, in casual conversation, that his main reason was to educate sons who he expected eventually to follow him in his enterprise. He had noted that a young man anxious to learn a business or profession is more influenced by what is on a printed page than by the offhand and disconnected verbal advice he may receive from an elder man of experience.

**There are, apparently, but two ways** to learn the intricacies of any business or profession. One is in the hard school of individual personal experience, which is often costly and unnecessarily discouraging. The other is a thorough understanding and intelligent use of the experience of others. The difficulty in the second method is that most textbooks are more theoretical than practical, and are generally written by professional authors who seek to interpret the experience of others.

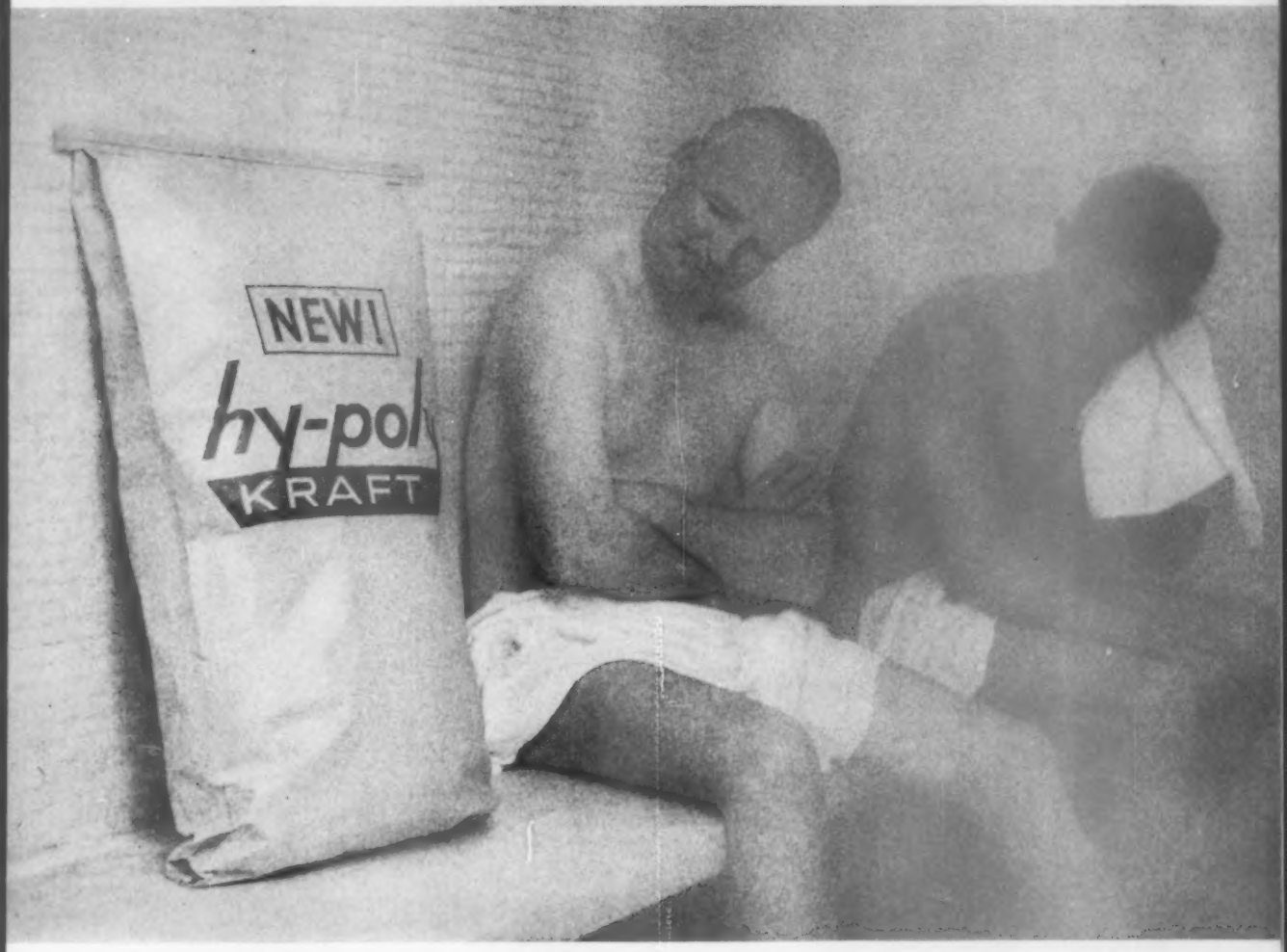
As might be expected under the peculiar circumstances in this instance, the author is able to interpret his own large experience, and with an objectivity and philosophy which makes it of so much interest and value. More than that, the author has had an active part in developing the industry as a whole, and has had ready access to all the contemporary experience and literature on his subject. The result, as can well be imagined, is a work of really encyclopedic character on all phases of the ready-mixed concrete industry.

However, the reader will soon discover that this book is of much value to any young businessman in almost any line of enterprise, particularly so, of course, in the production and marketing of a building supply product. Such, for example, are the chapters on finance, credit rating of customers, labor relations and marketing or merchandising. Most businessmen writers and speakers are usually reluctant to publicize their own errors and failures, although ready enough to offer advice. So, when an author can discuss his experience, including failures and mistakes, as well as his successful achievements, in an analytical and philosophical mood, the reader can really profit from the recorded experience of another. Having once absorbed the breadth and completeness of the contents of this book, the reader should be well protected against errors of judgment that have proved so costly to many a new enterpriser.

As an example of the philosophical nature of his attitude, we turn for a moment to the discussion of labor relations, which we know is a troublesome problem of nearly all producers, especially those who have to deal with the Teamsters' Union. Some have had bitter experience with unions, and their opinions of unions and of union leaders or bosses

*Please turn to page 152*

# Now International Paper saves you $5 to $16 per thousand PE multiwalls!




## Read why new humidity-proof "Hy-poly" kraft makes medium and low-density polyethylene sheets extravagant!

THE multiwall bag you see taking a Turkish bath in our picture contains *calcium chloride*.

We steamed this new Bagpak® multiwall in 95% relative humidity at 120° F. for 48 hours. (Unprotected, under these conditions, this chemical takes on 2½ times its weight in water in about an hour!)

But when we opened up the bag, the thirsty crystals spilled out as though they had been stored on the Sahara!

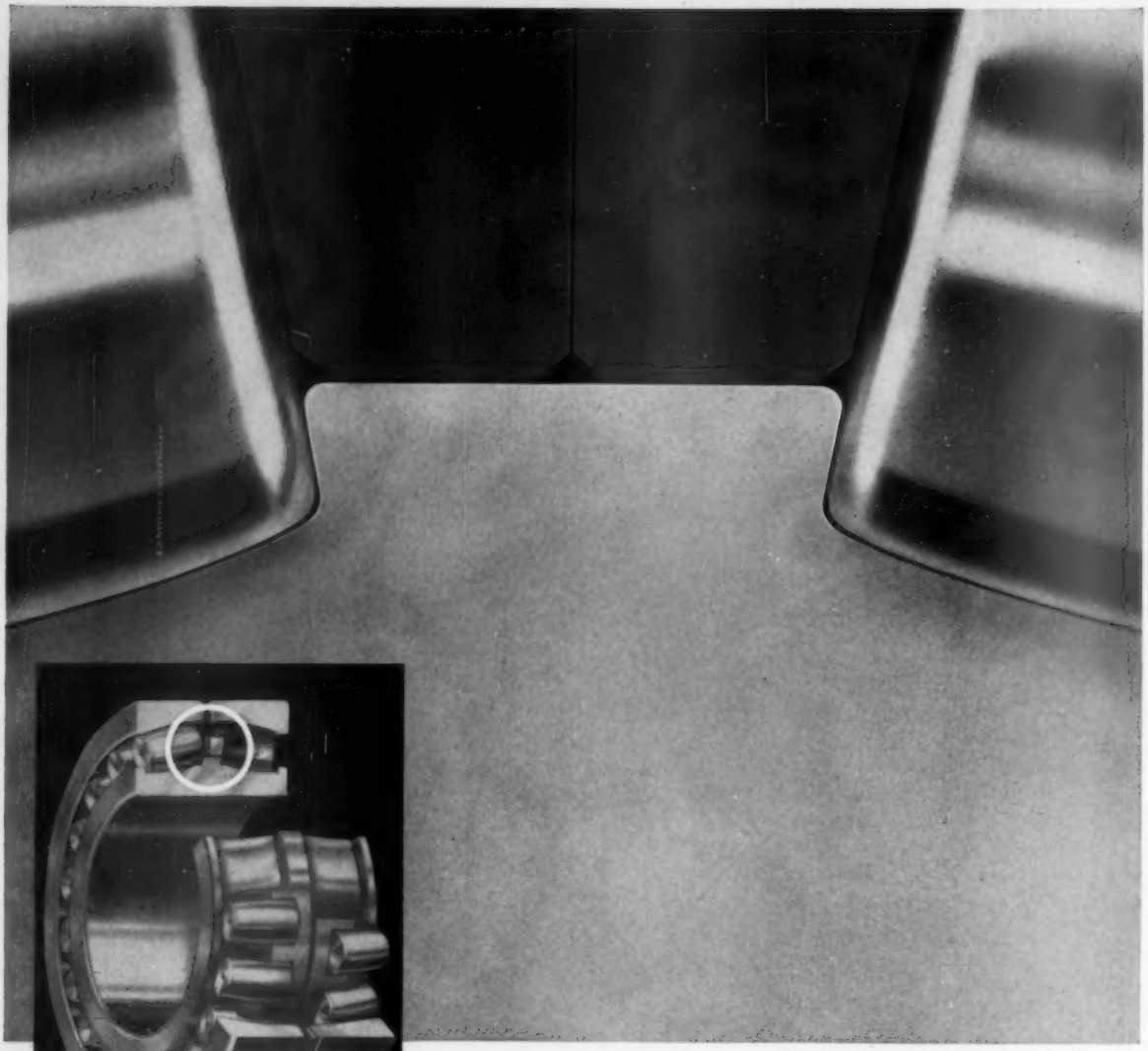
And Bagpak's new Hy-poly kraft *saves you money*. You stand to save from $5 to $16 per thousand multiwalls!

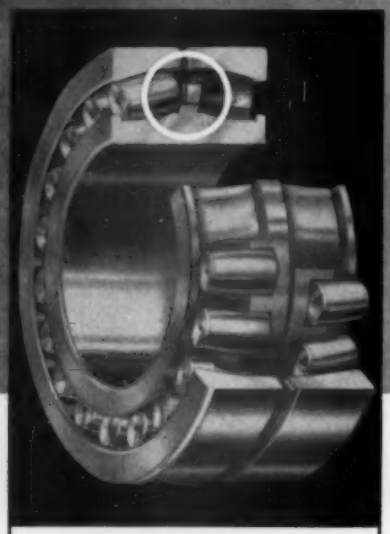
That's because new Hy-poly kraft is so superior to medium and low-density PE sheets that you get equal, if not greater, moisture-vapor protection from a coating approximately *half as thick!*

Extensive laboratory tests prove that this dramatic new barrier sheet is superior in *every way*. Write us today for samples.

See how calcium chloride protected by Hy-poly kraft Bagpak, pours after 48-hour steam bath!

Bagpak Division **INTERNATIONAL PAPER** New York 17, N.Y.





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**Spherical Roller Bearings Offer:**

- inherent self-alignment
- conformity of rollers to raceways
- integral center guide flange for stability
- positive roller guidance
- land-riding bronze cages
- maximum radial and thrust capacity
- controlled internal clearance
- electronically selected rollers
- even load distribution
- long, dependable service life

Send for new Torrington Spherical Roller Bearing Catalog #258.

# *Keystone of Stability!*

The integral center guide flange of the *Torrington* Spherical Roller Bearing provides *positive* roller guidance—the one best way to insure operating stability under radial and thrust loads.

Center guide flange surfaces and roller ends are ground to a common spherical radius. The asymmetrical roller seeks this flange under load, bearing lightly but constantly against it. Roller wobble and skewing are eliminated, and stress concentrations leading to early failure are avoided. Bearing operation is cooler, quieter and smoother.

The integral guide flange is adapted from the same principle used in the design of Torrington Tapered Roller Bearings. It is an engineering refinement, based on experience in all types of applications, that insures outstanding performance in your equipment. **The Torrington Company, South Bend 21, Ind.—and Torrington, Conn.**

**TORRINGTON BEARINGS**

*Every Basic Type of Anti-friction Bearing*

**SPHERICAL ROLLER • TAPERED ROLLER • CYLINDRICAL ROLLER • NEEDLE • BALL • NEEDLE ROLLERS • THRUST**

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# WASHINGTON LETTER

by EDGAR POE

**Tax cut is Dim in 1960**

The outlook for a federal tax reduction next year is extremely unfavorable at this time. If anything, federal budgets are likely to get bigger, rather than smaller.

On the other hand better business conditions, which means increased tax collections and higher personal and business incomes, probably will strengthen the weakened condition of the Treasury Department. Greater yields from present taxes apparently is the remaining slender hope for a future tax reduction.

**Concrete Bridges**

Congress has been advised that one of the major new industries in the highway field is the prestressed concrete industry. The initial plant began production in 1950. By 1953 there were 12 plants, by 1955 about 125, and today there are more than 280 plants in operation supplying millions of square feet of prestressed concrete bridges. The expanded highway program is a primary reason for the birth of this growing industry.

**Confusion Over tax Decision**

Confusion has cropped up across the Nation because of the United States Supreme Court decision upholding the rights of states to tax firms on income earned in interstate business. A House Judiciary Subcommittee headed by Representative Edwin E. Willis of Louisiana, will start hearings this autumn on the many bills that have been dropped in the legislative hopper. Most of the pending measures would limit the rights of states to tax firms which have no offices, inventories, warehouses or stores in those states. Thus they would in effect override the Supreme Court ruling.

"This whole over-all legal question is highly complicated," said Chairman Willis. "It would be our desire, if possible, to come up with legislation providing for taxing by the various states as uniform as possible, and thus prevent double taxation of income."

Bills are pending which would prohibit a state from taxing a firm unless it has maintained a stock of goods, an office, warehouse or other place of business, or had an officer, agent or representative who has maintained an office in a state. A White House conference has been suggested in an effort to iron out some of the confusion.

**ABC road Mileage**

The latest mileage figures for the so-called Primary and Secondary systems in the United States are: Primary system (including 22,000 miles in urban areas) 256,000; Secondary system (including 9,000 miles in urban areas) 554,000 or a total of 810,000 miles. These programs are now called the ABC program to distinguish from the proposed 41,000-mile Interstate program.

**Interstate Upkeep**

Testimony presented to the House Ways and Means indicates that the various states will be faced with a substantial upkeep bill when the Interstate Road System is complete. R. R. Bartelsmeyer, president of the American Association of State Highway Officials, said annual maintenance cost will average about $10,000 a mile.

**Piggyback Traffic up**

House and Senate Interstate Commerce Committees are watching with interest the growing piggyback traffic by railroads. There has been a marked increase in the past few years in the number of trailers and trucks moving piggyback via flatcars.

Meantime, officials of the Association of American Railroads express belief the day is coming when more than 50 percent of railway traffic will be handled by piggyback method. Reason for the increase is that railroads on long hauls can move freight cheaper than the trucks. Use of trailers eliminates terminal charges in transferring goods and materials.

**Ohio tops Seaway** Interstate Commerce Commission officials express doubt the present generation of Americans will witness the day when the St. Lawrence Seaway carries as much traffic as the Ohio River. A total of 81.6 million tons moved on the Ohio in 1957. Estimates for the St. Lawrence, on the other hand, are 25 million tons in the first full year of operation; 50 million tons in 1965, and 65 million tons in 1975.

**Mileage Soars** The Federal Bureau of Roads estimates that cars, trucks, and buses will be driven close to 70 billion miles in the U. S. this year. It would put the total 1959 mileage 35 billion miles ahead of 1958. More than 40 percent of this year's mileage will be in city areas.

**Freight car Problem** The freight car supply situation, a serious problem for several years, is growing worse. The Interstate Commerce Commission declares that despite the generally expanding economy there is less equipment now than during World War II.

The ICC said studies made in 1950 indicated a total of 1,935,500 freight cars would be required by 1956 to meet the anticipated needs of shippers. As of January 1, 1958, freight car ownership and control of Class 1 railroads totaled 1,824,603 cars, but by May 1, 1959, such ownership and control had declined to 1,781,313 cars.

**Business, Politics Do mix** More and more businessmen are getting their feet wet in active politics. Why? They have found out that they have made a mistake by "letting George do it." Now many of them are learning it is to their own business welfare. The old saying that business and politics don't mix boomeranged a long time ago.

Now business people across the Nation have found out that because they have shied away from politics, some labor union dictators are having an indirect voice in the operation of their businesses.

Other businessmen are now beginning to find out that politics and business do mix. The United States Chamber of Commerce has received orders for thousands of sets of its action course in practical politics. Individual employes are being encouraged to take part in politics.

Some of the country's leading corporations, like Gulf Oil Co., General Electric, American Can Co. and Ford Motor Co., are sponsoring courses in practical politics. Dozens of cities have also adopted programs. As an example, Schenectady, N.Y., expects to train several hundred businessmen in politics by the end of the year. Shreveport, La., was one of the first in the country to rally its business people to take an active role in politics.

How much community good will come from the political courses from a textbook is a matter of conjecture. One thing is certain, however: Many key businessmen are enthusiastic over the courses. Only time will determine whether it turns out to be a fad.

**Treasury Proposes Tax change** Selected United States machinery users have been polled by the Treasury Department for their views on depreciation. The Treasury plans to use the findings borne in the responses in presenting recommendations on depreciation legislation to the House Ways and Means Committee during the autumn hearings.

Both Congress and the Treasury Department realize that the existing depreciation laws are poor and unjust in many respects. Relief from those laws probably will come at the 1960 session.

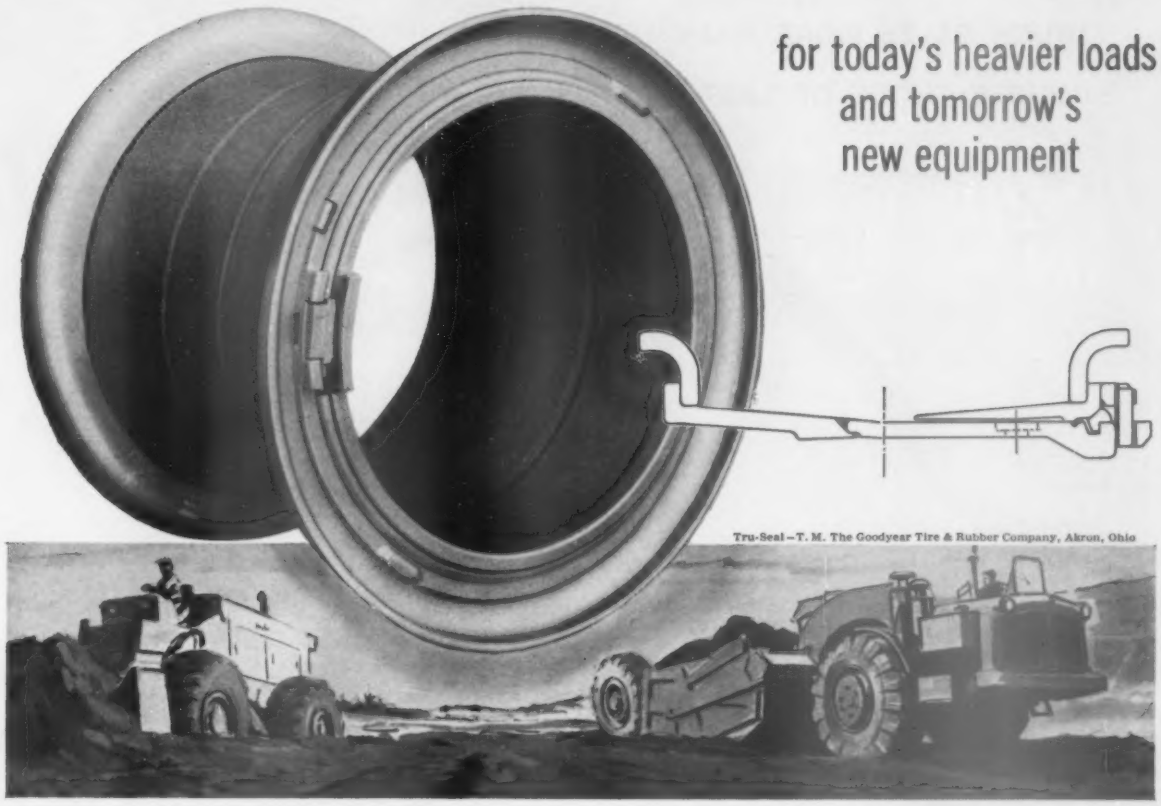
**Keogh bill Goes over** A measure sanctioned by the House earlier in the session, giving self-employed persons a tax break in setting up their own retirement plans, will remain alive before the Senate when Congress reconvenes in January. Under terms of the House-approved Keogh bill, a self-employed person could deduct up to $2,500 a year for funds invested in an approved retirement plan or up to $50,000 during a lifetime.

**Thai Cement Plant** As some of the less-developed countries of the world are expanding their road and airport building programs, the International Finance Corp. has been making some loans abroad. For example, IFC recently made a commitment to loan $300,000 at 6 percent interest rate in the Concrete and Aggregate Co., Ltd., which is a Thailand corporation affiliated with the Siam Cement Co., Ltd. CPAC began operations in 1952 by selling sand, concrete aggregates and electric power. In 1956 CPAC introduced the manufacture of prestressed concrete products in Thailand.

Introducing

# The New Earth-Mover Rim

for today's heavier loads
and tomorrow's
new equipment



Tru-Seal—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

To meet the increased tonnages and the higher speeds of today's and tomorrow's earth-moving equipment, Goodyear presents a whole new line of heavier, stronger rims.

The new Earth-Mover Rim offers these standout advantages in every size from the smallest to the largest:

Extra thickness and weight to withstand greater horsepower, greater tire pressure and heavier loads. Down time reduced to a minimum.

Heavy-duty bead seat band driver—to prevent slipping.

Sealing ring – Goodyear's famous Tru-Seal principle provides positive air seal.

The Goodyear Earth-Mover Rim is now available in 29-inch and 33-inch diameters. These fine job-fitted rims are your best insurance against premature tire and rim failure.

Next time you need rims, why not benefit by Goodyear's incomparable experience in building rims of every kind and size for all types of vehicles. See your local distributor, or write:

Goodyear, Metal Products Division, Akron 16, Ohio.

**Your tires go farther on RIMS by**

# GOODYEAR

**MORE TONS ARE CARRIED ON GOODYEAR RIMS THAN ON ANY OTHER KIND**

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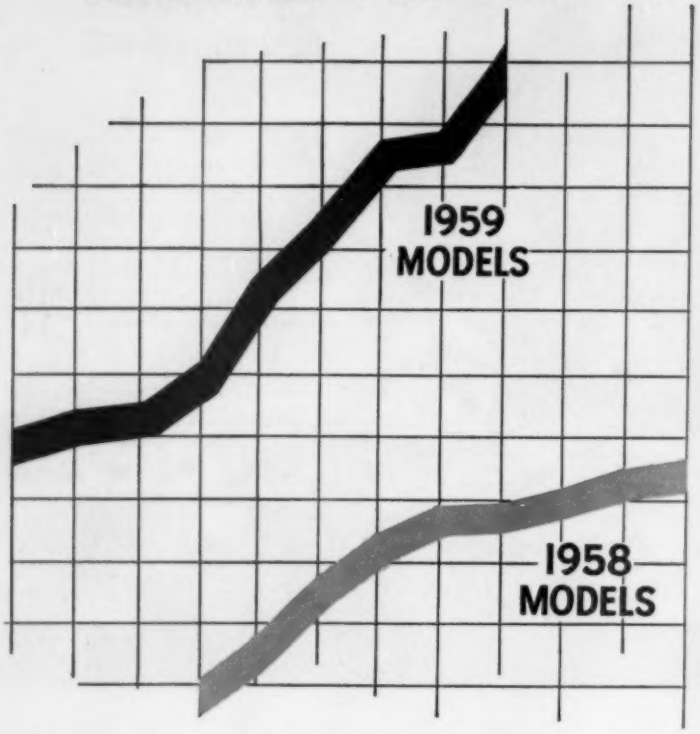
# The BIG SUCCESS

**1959 FORD SUPER DUTY TRUCK SALES MORE THAN DOUBLE THOSE OF LAST YEAR**



# 1960 FORD SUPER DUTIES

**SKYROCKETING SALES OFFER ADDED TESTIMONY TO THE TOUGHNESS AND RELIABILITY OF FORD "BIG V'S"— *NOW* THEY'RE MORE DURABLE, MORE FLEXIBLE THAN EVER!**

Ford's increase in sales of Super Duty Trucks, while impressive in itself, by no means tells the whole story. Over half of the 1959 unit sales were the result of repeat orders from operators like Trucking Contractors, Inc., who bought because the Ford "Big V" provided the kind of performance and durability needed for their work.

And for 1960, the Ford Super Duties offer additional refinements designed to provide an even greater degree of dependability. Bigger optional axles and increased GVW's permit greater payloads and more profitable operation. Automatic radiator shutters to keep the engine temperatures within the most efficient operating range, submerged-type electric fuel pump to prevent vapor lock, and redesigned wiring for longer, more dependable operation are but a few of the improvements which add to the performance and durability of these units.

The changes offered for 1960 were tested and evaluated by America's foremost independent automotive research organization. The certified results of the studies by this impartial firm (name available on request) provide proof that Ford's Super Duty Trucks are even more dependable.

- **Certified Durability through closer temperature control!** Independent research engineers certify that Ford's thermostatically controlled radiator shutters kept water temperature between 168° and 188° in severe mountain grade operation. The test truck with shutters blocked open

# of the Big Truck Field

**"Tried 8 in '58—bought 20 more in 1959,"** says Curtis E. Brost, President, Trucking Contractors, Inc. "In 1958 we bought 8 Ford T-850's with lightweight chassis options and specially built 5-batch bodies which gave us a full extra batch per truck. A 5-batch load is a real strain on the truck when you consider we're 'running the ditches' on this highway paving job in North Dakota. These T-850's worked out so well that we ordered 20 more in '59. Our Ford Tandems with the 477 engine give us good mileage and the drivers are real happy with them. It's a rough go on trucks with soft footing and dust so bad we have to drive with headlights on. Despite such operating conditions, downtime has been negligible and these '477' Fords have given us less trouble than other trucks we have operated."

## with Certified Durability

under same operating conditions had a temperature range from 102° to 181°. The temperature variation of only 20° with shutters means less expansion and contraction in engine block and cylinder heads. Higher temperatures with radiator shutters permit leaner fuel-air mixtures with less possibility of raw gas washing down cylinder walls. Warm oil circulates more freely, reducing internal friction. All these factors contribute to longer engine life.

- **Certified Dependability with longer-lived electrical system!** Ford's '60 improved wiring harness and the 1959 wiring harness were subjected to shaker table tests plus constant exposure to oil and water vapors and temperatures of 200°. Certified results prove that the greater resistance to deterioration by heat, oil, water and abrasion obtained with the 1960 wiring harness more than doubles wiring harness life.

- **Certified Reliability with Ford's submerged-type electric fuel pump!** Dynamometer tests of engines with submerged-type electric fuel pump and conventional mechanical type showed that vapor lock was non-existent with Ford's electric pumps at temperatures up to 200°, whereas incipient vapor lock with mechanical pump resulted in a power loss of 9% at an underhood temperature of 200°.

Test results like these plus the experience of satisfied users are important but that is not all. For 1960, the Super Duty line has been broadened to provide even more flexibility in power train options. Get the facts from your Ford Dealer!

**FORD TRUCKS COST LESS**

***LESS TO OWN . . . LESS TO RUN . . . BUILT TO LAST LONGER, TOO!***

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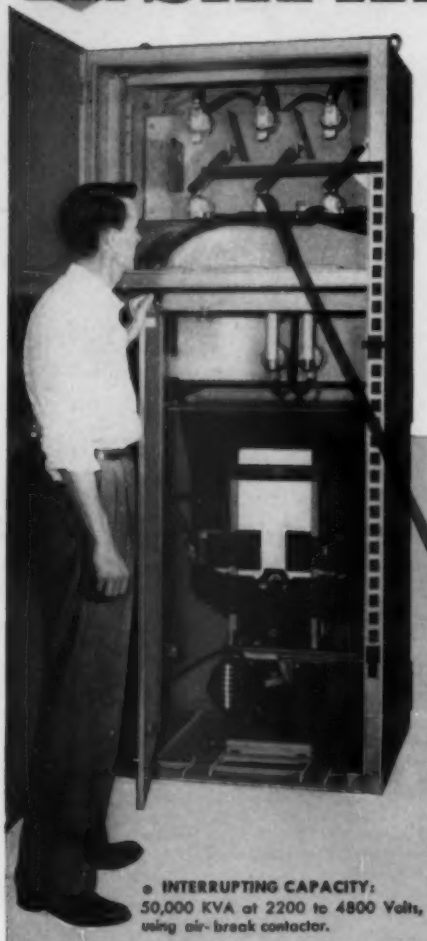
*For those who think twice about*

# TWO E-M MOTOR CONTROL LINES

## E-M SAFAIR Magnetic Control (NEMA CLASS E-1)

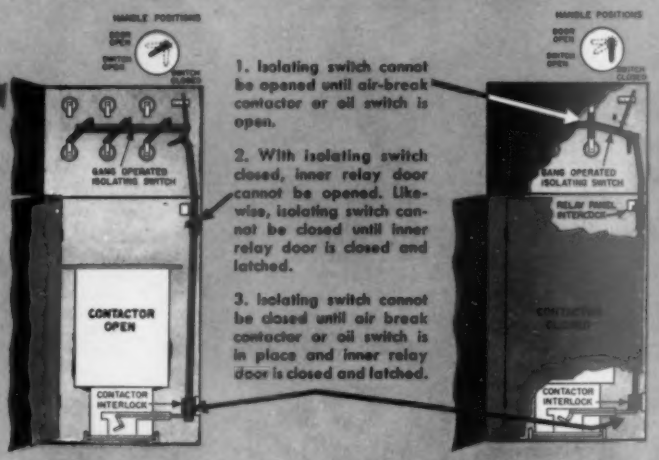


● **INTERRUPTING CAPACITY:** 50,000 KVA at 2200 to 4800 Volts, using air-break contactor.

### *Compare these features with those of your present controls*

1. **Complete Personnel Safety** with a foolproof system of mechanical interlocking between gang-operated isolating switch, oil switch or air-break contactor, and compartment doors.
2. **Complete Motor And Control Protection.** Skillfully engineered and applied components are carefully coordinated to protect both motor and control over complete design range of overload and fault conditions.

**You can't make a mistake with the E-M Mechanical Interlock!**

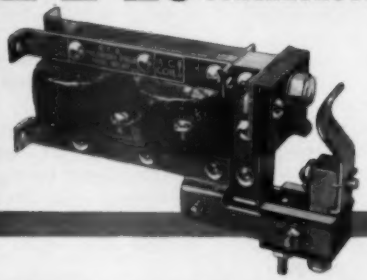



1. Isolating switch cannot be opened until air-break contactor or oil switch is open.
2. With isolating switch closed, inner relay door cannot be opened. Likewise, isolating switch cannot be closed until inner relay door is closed and latched.
3. Isolating switch cannot be closed until air break contactor or oil switch is in place and inner relay door is closed and latched.

**E-M SAFETY-GANG ISOLATING SWITCH** of SAFAIR Control is externally operated, internally interlocked as detailed in color and diagrams above, right.

SAFAIR features a 50,000 kva (NEMA Class E-1 maximum rating) air-break contactor suitable for repetitive motor starting and rapid switching in a complete line of squirrel-cage and wound-rotor induction motor controls and synchronous motor controls.

## PFR* for Simple, Reliable SYNCHRONOUS MOTOR CONTROL



Safair- and Safuse-controlled synchronous motors pull into step smoothly and powerfully every time. E-M-invented *Polarized Field Frequency Relay system of synchronous motor

3300-TPA-2189

## ELECTRIC MACHINERY

*Originators of the safety-gang*

*their men and motors...*

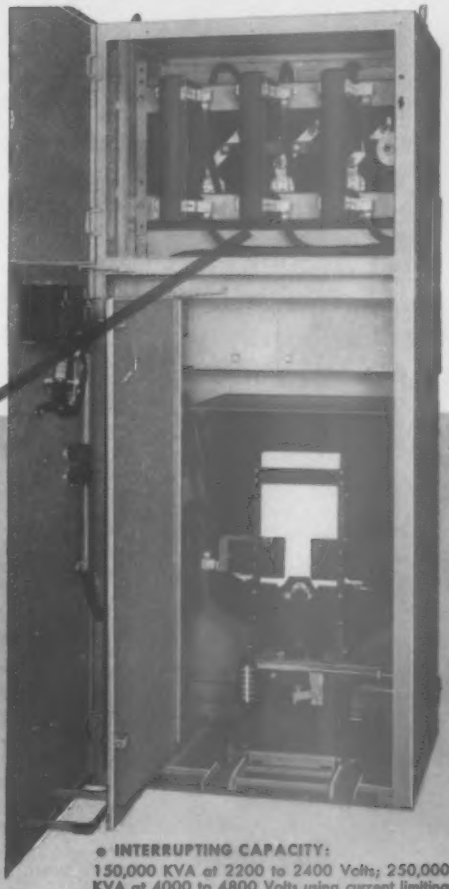
# OFFER COMPLETE PROTECTION!

## E-M SAFUSE Magnetic Control (NEMA CLASS E-2)

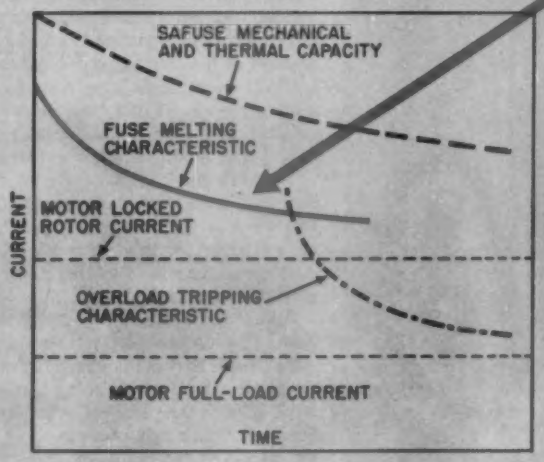
- **Complete Front Accessibility.** Controls may be placed in rows, back-to-back or back-to-wall—no access required to back or sides.

4. **Complete Space Utilization.** Imaginative E-M engineering has provided a highly compact control design without compromise on safety or performance, and with provision to accommodate modifications.

5. **Complete Modification Line.** You can tailor the control to fit your exacting requirements—nearly 100 options and special features available.



• INTERRUPTING CAPACITY: 150,000 KVA at 2200 to 2400 Volts; 250,000 KVA at 4000 to 4800 Volts, using current limiting fuses with air-break contactor or oil switch.




starting and synchronizing is sensitive to the electrical condition of the field winding, applying field excitation at proper rotor angle for maximum synchronizing torque with minimum current inrush . . . and it's coupled with E-M's modern field failure protective system.

**FAST ACTING FUSES** *plus* E-M Safety-Gang Isolating Switch in SAFUSE are the best possible combination for complete motor and control protection thru NEMA Class E-2 maximum ratings. The current limiting fuses provide short circuit protection and are carefully coordinated with overload relays as shown in diagram above.

Complete information and helpful application data are available from your E-M Field Engineer. Call him and write the factory for publications 242A and 249.

**SAFUSE GIVES YOU CHOICE OF AIR-BREAK CONTACTOR OR OIL SWITCH**

For highly repetitive duty use the roll-out air break contactor. But for less frequent starting—or in areas of severe dust, dirt, moisture, or corrosive fumes—the roll-out oil switch is recommended.

**MFG. COMPANY** MINNEAPOLIS 13, MINNESOTA

*disconnect high-voltage fused control*

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# LABOR RELATIONS

A ROUNDUP OF ACTUAL DAY-TO-DAY IN-PLANT PROBLEMS AND HOW THEY WERE HANDLED BY MANAGEMENT MEN

## How would you decide?

**Does an employer have a right to change working conditions while he still has a contract with the union?**

*What Happened:* One day the company came out with a new regulation. It said that in the future all employes would have to take an annual medical examination at company expense and on company time.

This raised quite a few protests. "You cannot institute a new rule like that," the union claimed.

"There's nothing in the contract that prevents us from doing so. These examinations are for the benefit of the employes, and if we take any action that's unfair, they can file a grievance. There's nothing unfair about this rule —lots of companies have it. The rule stays."

The union refused to go along with this thinking and the case finally came to arbitration.

**Was the employer:**
**Right?** ☐ **Wrong?** ☐

*What Arbitrator Whiting ruled:* "Prior to the certification or recognition of a collective-bargaining representative, an employer has an absolute right to establish such conditions of employment as it may desire. After the recognition of a collective-bargaining representative, the law requires the employer to bargain upon conditions of employment. Such an agreement operates as a limitation upon the previous absolute right of the employer to establish working conditions. The preexisting right of the employer still continues as to all matters not covered by the agreement. The employer thus has the right to establish or change working conditions for which the collective agreement makes no provision. Accordingly, the abritrator finds that the employer may institute this new regulation inasmuch as it is not covered by the contract."

**Can management assign workers to do personal chores for the boss?**

*What Happened:* "Say, Harry," the supervisor said. "When you get through here, go over to our vice president's house and mow the lawn." Harry nodded, but before he left the plant he talked to his shop steward, who had an opinion of his own about this.

"You can't assign a man to do this kind of work. If the boss wants his grass cut, let him hire a local man in town," the steward told the foreman.

"I don't see that it's any of your business," the foreman retorted. "If you want to get technical about it, we have a right to direct the workforce. As long as the man's getting paid, he's got no beef coming."

"We'll see about that," the steward said and promptly filed a grievance on the grounds that management's control does not extend to assigning a man to work outside the plant on noncompany business. When management supported the supervisor's action, the case came before Arbitrator Louis A. Stone.

**Was the company:**
**Right?** ☐ **Wrong?** ☐

*What Arbitrator Stone ruled:* "A union has a right to question management's assignment of a worker outside the plant. Management's right to direct its workforce is limited to matters concerned with the conduct of the plant only. Mowing a lawn for the vice president is not a plant matter and a worker can refuse the assignment."

*(Continued on page 32)*

# THE WEMCO-REMER JIG HANDLES LARGER TONNAGE OF SAND AND GRAVEL MORE PROFITABLY!

*because only WEMCO meets all these requirements*

- High feed capacity
- Ample length of bed to insure full stratification and complete separation
- Uniform porosity of bed for even distribution of vertical water pulsations
- High hutching capacity for full recovery
- The *only* jig that will work on sand

*The Wemco-Remer Jig produces specification material from deposits previously unusable because of shale, coal and other lightweight particles. The unique Wemco double-stroke makes the difference; permits use of larger jigging area; gives greater efficiency to the jigging action without sheet spots; enables longer, trouble-free operation with minimum maintenance and operation costs.*

*Find out how the Wemco-Remer Jig can work profitably in your operation.*

WEMCO®

*a division of*
Western Machinery Company, Dept. R-P
650 Fifth St., San Francisco, Calif.
*and throughout the world*

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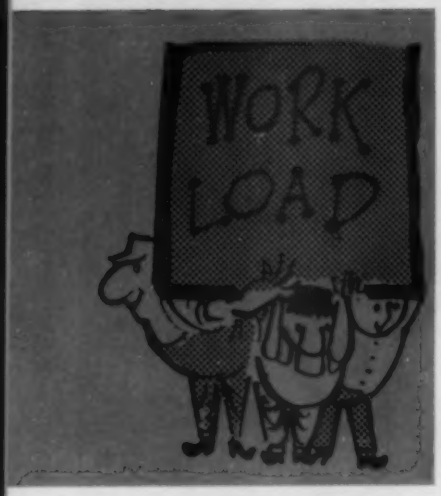



**Can a union protest a layoff on the grounds that it will put "undue burden" on the remaining employes?**

*What Happened:* The company's agreement with the union had a clause which said that management had the right to determine the number of employes necessary for the "proper running" of its business. When management, because of poor business, gave notice of layoff to several of its employes, the union interceded.

"If you go through with this layoff, the remaining employes will have to work harder. They will be overburdened. You need more people to properly run your business. So you must cancel these layoffs."

Management didn't see it like that at all. "The number of people we need is our responsiiblity. If the remaining employes feel that they are overburdend, we'll take up that problem when we come to it."

**Was the union:**
**Right?** ☐ **Wrong?** ☐

*What Arbitrator Trotta ruled:* "Neither the arbitrator nor the union can or should substitute their judgments for that of the employer on what constitutes 'proper running' of a business, or how many employes are necessary to run an operation. An employer has the financial responsibility for the business, and with this must go the right to operate the business in the manner he believes will result in a successful enterprise. The grievance is denied. The employer has the right to make the decision on the number of employes he requires."

**When can't you fire an employe who has been absent without notice 39 times in one year?**

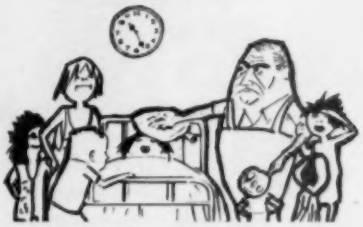
*What Happened:* John Meeker, a 7-year employe of average efficiency, began to accumulate a series of absences last year. It seems he was having a lot of family problems. His wife was sick and he had six children, three of whom were not in good health. After 10 absences he received a written warning notice. After 38 absences he was given a second notice. The next time he was absent, he was fired. The company had a written rule that any employe who was chronically absent would be warned, and after 2 such warnings would be subject to discharge. John protested:

1. I had a lot of troubles and couldn't come to work regularly.
2. I'd like another chance.

The company was impatient with John's argument:

1. We put up with 39 absences. That's enough.
2. We go by the rules—2 warnings, out. That's fair to everyone.

**Was the company:**
**Right?** ☐ **Wrong?** ☐



*What Arbitrator Seligson ruled:* "In spite of John Meeker's poor attendance, I am constrained to reverse the company's action in discharging him.

"There was almost a 'mechanical' carrying out of a rule. Absences were recorded. After the company concluded there were enough, a written warning was handed 'mechanically' to Meeker. On other occasions when he was talked to about his attendance he was merely 'told' or 'warned' that he must improve. During this whole period, not once was he called off the floor by his foreman, department head or personnel department for a conference to delve into the causes for his absences. Neither was the cooperation of the union sought, as it had been on other employes.

"If the company insists on asserting its right to manage the working force, it must also assume the responsibility —as part of the management function —to find out the causes behind employe deviations from rules before it imposes punitive discipline. Punitive discipline should not be imposed until a reasonable investigation has been made of the causes, and some attempt made to help him solve the problems that are causing the absences." The penalty was reduced to a disciplinary layoff.

**Are employes who go out on a wildcat strike entitled to holiday pay?**

*What Happened:* The company and the union were having a "hassle" over whether or not the management had a right to use outside contracts to install some new equipment. The company said "yes" and the union said "no." The plant superintendent suggested a solution—"Let's arbitrate and get a quick decision."

The union refused. Instead it ordered the workers out two days before a holiday. The company got in touch with the international branch of the union. The parent union agreed that this was a "wildcat" strike and persuaded the men to return to work.

The company disciplined the workers by denying them pay for the holiday which came while they were striking. The union protested. It claimed:

1. The contract calls for holiday pay and you cannot use this as a disciplinary measure.
2. The agreement does not list "strikes" as a reason for denying holiday pay.
3. If you want to discipline employes for "wildcatting" you can do so some other way—but you can't deny them benefits like holiday or vacation pay.

The company maintained that it had a right to select any discipline it chose.

**Was the company:**
**Right?** ☐ **Wrong?** ☐

*What Arbitrator Schmidt ruled:* "The violation of the no-strike pledge cannot be condoned. It warranted the imposition of some penalty or discipline. This the union apparently concedes. I cannot agree with the union claims that refusal of holiday pay to workers who are on a wildcat strike during the holiday week is unjustified because such action is not explicitly spelled out in the holiday-pay article. The withholding of holiday benefits from workers on strike when the holiday occurs is a type of penalty which comes within the definition of discipline. The grievance is denied. Management's action is justified." **END**



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**Reo's revolutionary new Flywheel P.T.O.** brings to transit mix operators a "*bonus*" *payload increase from 400 to 600 lbs. per trip*— actual weight savings in a 6½ cu. yd. mixer unit resulting from the elimination of separate engine power.

Also eliminated are the headaches of separate service and maintenance requirements.

**Reo engineered and installed** as an integral part of the chassis engine drive, the Reo Flywheel P.T.O. supplies the mixer with a lighter and more efficient new source of power—smooth . . . even flowing . . . direct.

**Most important,** operators can have the "bonus" payload advantage of Reo's new P.T.O. at a low initial cost of equipment. Now available in Reo's rugged "C" Series line of transit-mix trucks. Another product of Reo's creative engineering skill has been added to the many important values found only in Reo Trucks. Reo Division, The White Motor Company, Lansing, Michigan.

*Gold Standard of Values*

# Fuller . . . headquarters for

# Feeders

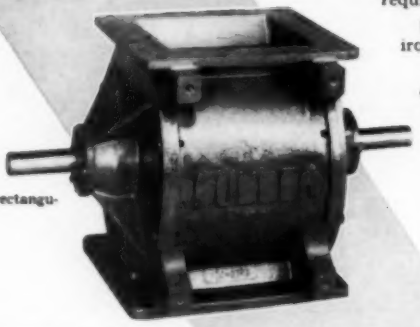
Fuller Roll Feeder for volumetric accuracy, without pulsations.

When your problem is one of feeding dry, pulverized or granular materials, why not come direct to headquarters—FULLER—designers and builders of various feeders for many uses. We have built thousands of feeders for the process industry, year in and year out, for over a quarter of a century. Many have been of special types to meet individual requirements.

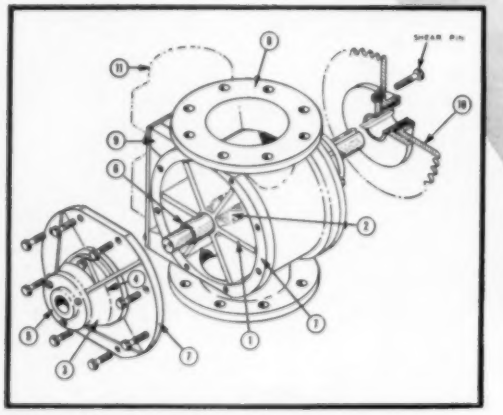
Standard feeders are built of cast iron or combinations of iron and steel. When required, they can be built of special alloys.

The Fuller Roll Feeder is especially adaptable to handling of dry, pulverized materials with volumetric accuracy, without pulsations. Vane type feeders are built for use where extreme volumetric accuracy is not particularly essential. They are built with stuffing boxes and ball bearings, for vacuum, low pressure, and general purpose uses, with circular or rectangular flanges.

For complete information write for Bulletin F-5.



Vane type feeder with rectangular flanges.



Vane type feeder with circular flanges. Rigid drive for minimum space requirements. Eliminates drive stress between feeder and related equipment.

***Description of drawing above:***

1. Six vanes. Two vanes seal between inlet and outlet.
2. Tapered rotor hub. Reduces friction from trapped material between rotor and headplates.
3. Integral-cast bearing brackets insure concentric bearing centers with male-female joint between headplate and feeder body.
4. Bearing brackets on sides of packing glands allow free drop of packing gland leakage; prevents material from entering bearings.
5. Integral-shielded ball bearings; Alemite fittings for ease of lubrication.
6. Shouldered shaft for externally centering and maintaining alignment of rotor, resulting in equal rotor end clearances and eliminating contact between rotor and headplates.
7. Heavy body walls and headplates. Rigid construction to permit smallest possible rotor clearances. Permits at least one possible remachining after normal wear.
8. Standard companion flange size and bolt circle permits connection to pipe size flanges.
9. Integral cast lugs for drive provides universal mounting for any type motor reducer. Rigid drive for minimum space requirements. Eliminates drive stress between feeder and related equipment.
10. Shear pin coupling with simple standard bolt shear pin.
11. Gear motor with right angle combination drive. Can be furnished with a parallel shaft drive if desired.

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**FULLER COMPANY**

**102 Bridge St., Catasauqua, Pa.**

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SOMETHING EXTRA!!

# SUDDEN SOUTHERN SERVICE

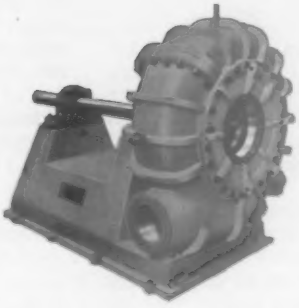
Thomas DURABLE Dredge Pumps, of course, give much longer service without need of repairs. But when you need repair parts or engineering service, you get them in a hurry! !

That's what users of Thomas Pumps throughout the U.S.A. have gotten into the habit of calling: "SUDDEN SOUTHERN SERVICE".

Sand and Gravel operators (and Dredging Contractors too) have repeatedly told us that not only do competitive pumps require more repairs more often, but that repair parts are frequently slow in delivery—hard to get.

AMPLE STOCKS OF THOMAS REPAIR PARTS ARE MAINTAINED by us FOR IMMEDIATE SHIPMENT. The Thomas Organization is alert to get them moving to you without delay. Thomas Engineers with long background of practical experience and technical training are ever-ready to get on the job to help you solve engineering problems—to help you get maximum production.

That's "SUDDEN SOUTHERN SERVICE" and if you're not a user of Thomas Pumps you've never experienced it. As one Thomas Pump enthusiast so aptly put it: "You don't know what you're missing."



Modern pump design and GENUINE, DEPENDABLE THOMAS NI-HARD in all wearing parts, makes an unbeatable combination. Add SUDDEN SOUTHERN SERVICE and you'll know why "you cannot buy at any price, a more durable pump for sand and gravel—you cannot buy one that will make you as much money! !"

(Available in sizes from 6" through 16".)

THOMAS FOUNDRIES Inc.

P. O. Box 1111, Birmingham, Alabama

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# PEOPLE IN THE NEWS

## Curtis elected bank director

FRED P. CURTIS, president of Lyman-Richey Sand & Gravel Corp., Omaha, Neb., and chairman of the board of Ready Mixed Concrete Co., has been elected to the board of directors of the United States National Bank of Omaha.

Mr. Curtis joined Lyman-Richey soon after graduation from Occidental College, Los Angeles, Calif. In 1958 he was elected chairman of the board of Ready Mixed Concrete Co. He serves as secretary-treasurer of the National Sand and Gravel Association and is a member of the Natural Resources Committee of the United States Chamber of Commerce, in addition to his many civic activities.

## Merger shifts Toledo officials

HARRY N. HANSEN has moved up to chairman of the board of directors of Toledo Plaster & Supply Co. and J. A. Nicholson, head of Nicholson Concrete Co., has become president of the building materials firm.

The company also announced that it would merge with the Penn Sand Co., a wholly owned subsidiary of Nicholson Concrete, and would handle the wholesale and retail sand business formerly conducted by Penn.

Mr. Hansen joined Toledo in 1912 as a clerk and has been president since 1930. He was founder and first president of the Ohio Building Material Dealers Association.

Mr. Nicholson, a graduate of Denison University and the University of Toledo's law school, formed his concrete mix firm in 1936. He is past president of the Ohio Ready Mix Concrete Association and is a director of the National Ready Mixed Concrete Association.

## Wristen named chairman

WILLARD WRISTEN has assumed the chairmanship of South Dakota Cement Commission, following his June appointment by Gov. Ralph Herseth. Mr. Wristen succeeds Jarvis Davenport of Sturgis, who continues on the commission. The governor named Lawrence Kean secretary-treasurer.

## Dallas manager

WALTER R. COOK has been named general manager of the newly created Dallas Div. of Texas Industries, Inc. The Dallas Div. includes Dallas Lightweight Co., Texcrete Structural Products Co., Texcrete Mosaic Corp. and Trusdeck Co.

Mr. Cook, a vice president of Texas Industries, will also manage lightweight aggregate operations in Eastland and production of concrete masonry units in Fort Worth under the new organizational structure.

Mr. Cook joined Texas Industries in 1955 as management coordinator. Previously he was a home builder and management consultant.

## Peerless promotes three sales heads

PEERLESS CEMENT CO., Detroit, Mich., a division of American Cement Corp., has announced the following promotions: S. W. Drews, assistant to the vice president of sales; J. F. Powell, director of masonry sales; and P. F. Vanderlind, director of highway cement sales.

## Vulcan appoints White blasting research head

HAROLD H. WHITE has been named director of blasting practices and explosives research for Vulcan Materials Co., Birmingham, Ala. A native of Great Britain, Mr. White holds a mining degree from the University of London. He was one of the first to introduce modern blasting methods in Latin America; among his larger projects were the first stages on the Third Locks Excavation of the Panama Canal and the Mexico-Laredo Highway.

## Active cement executive elected

C. BRUCE FLICK, secretary and treasurer, Ideal Cement Co., Denver, has been elected president of both the Rocky Mountain Control of the Controllers Institute of America and the Junior Achievement board of directors, Denver.

The Controllers Institute is a nonprofit management organization for all lines of business.

Junior Achievement is a program in which business and industrial leaders help students learn by doing.

## Sprickman retires

LOUIS W. SPRICKMAN, 67, has retired from service with Buffalo Crushed Stone Corp., a unit of Houdaille Industries, Inc., concluding a 35-year career in business.

For 16 years he was branch manager of a Wheeling Steel Corp. subsidiary in Buffalo. He joined the old Gravel Products Corp. in 1946., In 1957 he was assigned exclusively to pipe sales at Buffalo Crushed Stone.



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**HERE'S WHY**
**YOU GET MORE FOR YOUR**
**SECONDARY CRUSHING DOLLAR**

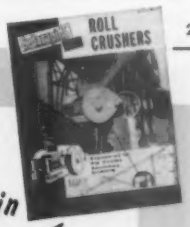
- Safety shear washers (patented) prevent damage from uncrushable material, permit greater tension on springs, thus allowing more material to be finish-crushed to reduce the circulating load.
- More efficient feeding. Material dropped between the rolls penetrates deeper into the crushing area, permits faster feeding. Special feed box with angle divider spreads material across full width of rolls, prevents uneven wear on roll shells.
- Low, rigid, extra-strong frame dampens vibration, reduces headroom requirements.
- Larger-than-average flywheel saves power, maintains high-capacity output even under surge loads.
- Extra-heavy shafts and bearings engineered for long service life.
- Six model sizes to meet volume demands and balance primary production.
- Wide range of roll shell types to handle many crushing conditions.

## You can crush more for less with CEDARAPIDS ROLL CRUSHERS

Basically, your profit depends on two things . . . the amount of aggregate you produce, and how much it costs you to produce it. Naturally your secondary crushers won't reduce *all* operating expenses, but if they're Cedarapids, they'll do more than you expect toward assuring greater plant production with lower per-ton costs. The combination of benefit-features in the adjoining panel show you a few of the reasons why you can crush more for less with Cedarapids Roll Crushers. Your Cedarapids Dealer will gladly explain the many other features that make these units your best buy. When you call him, be sure to ask about Cedarapids screens, primary crushers and other components for Cedarapids-engineered stationary plants.

**IOWA MANUFACTURING COMPANY**
**Cedar Rapids, Iowa**

2559-N




*Send for this Bulletin Today*

IOWA MANUFACTURING COMPANY, CEDAR RAPIDS, IOWA

Gentlemen: Please send Bulletin RC-1 with complete details about Cedarapids Roll Crushers. I am also interested in your

☐ Horizontal Vibrating Screens ☐ Primary Crushers
☐ Conveyors ☐ Washing Equipment
☐ Cedarapids Engineering Assistance

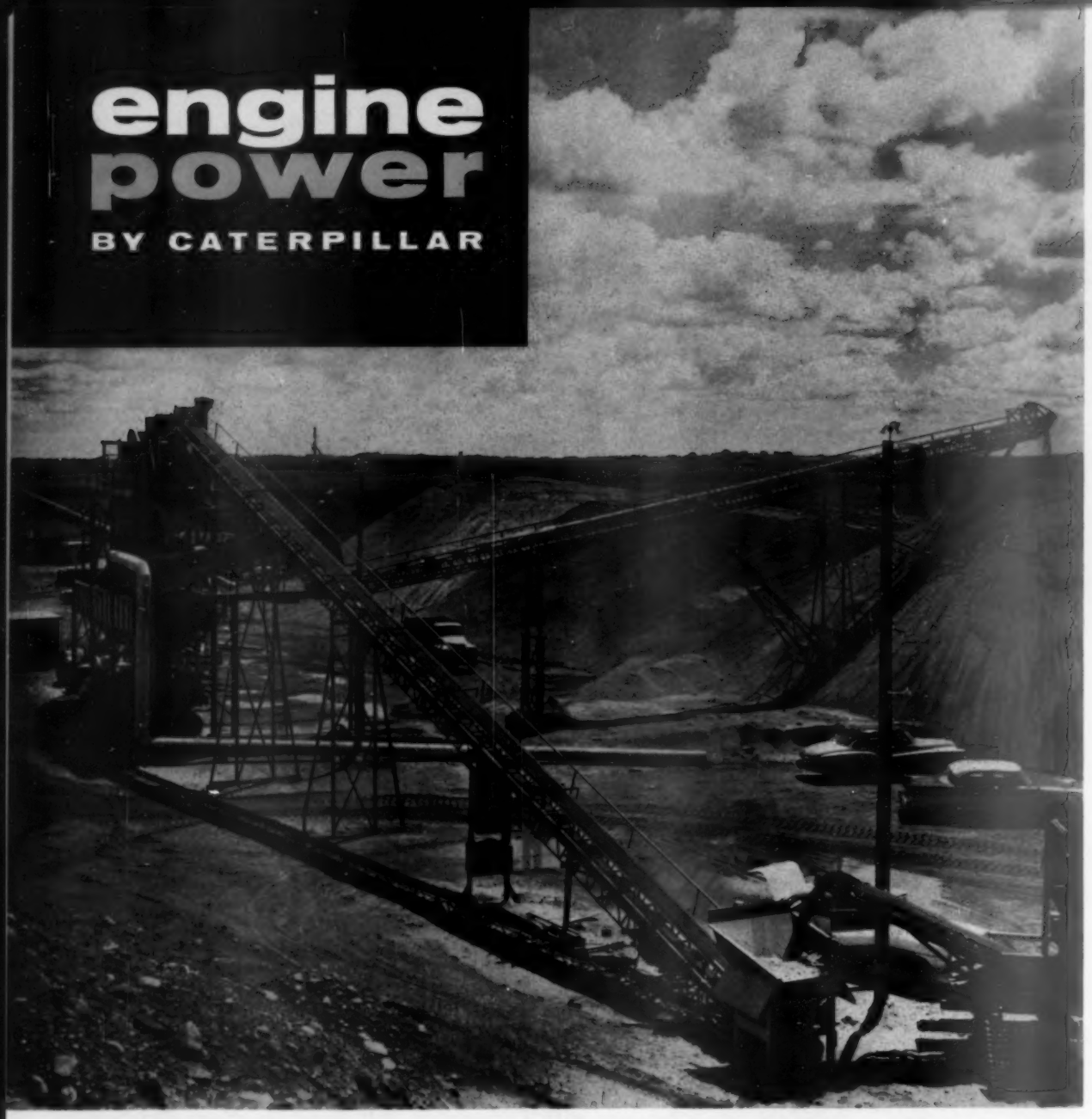
Name_____ Title_____

Company_____

Address_____

City_____ State_____

# engine power
## BY CATERPILLAR



A FINE EXAMPLE OF A MODERN OPERATION

*SOME*

PLANT

MODERNIZING

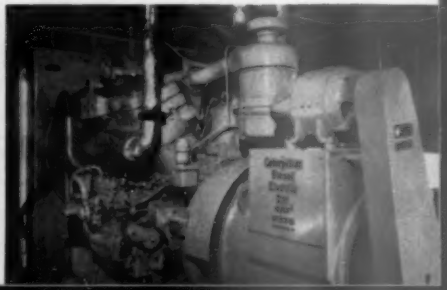
IDEAS

**OFF-PLANT POWER**

**This owner took the diesel away from plant vibration and dust, put a large-capacity fuel tank on the flat bed and made screen changing easier. This cut down on both engine and plant down time.**

**FULL ELECTRIC POWER**

**This D375 Electric Set replaced commercial power in Ohio sand and gravel plant, reducing primary power costs 60% and ending power failure and low-voltage problems. Owners say it will pay for itself in 3 years.**



# ARE YOU A COLLECTOR OR A PRODUCER?

## A Quick Count of Diesels on Your Machinery Will Give You the Answer

In the process of expansion, many aggregate producers have accumulated an excessive amount of small power units. They range from small gasoline electric sets mounted where only motors should be to 25-year-old Cat Diesels, still performing well, but lacking many production-boosting changes.

These small and old engines promote inefficiency. Most are in key areas and any failure could cause down time. Servicing is continuous . . . fuel and oil supply is a concern. Start-up and shut-down are major operations each day. Fuel costs are excessive and, above all, this complex of power encourages inefficiency on the part of operating and maintenance personnel on the job.

On crushers, up to a ton of headache-causing cross shafts, jack shafts, pulleys, belts and gear boxes can be eliminated by partial electrification.

How can you become more efficient?

1. Add all your mechanical horsepower requirements on the plant.
2. Add KW requirements also.
3. See your Caterpillar Dealer and specify direct drive from the flywheel to handle mechanical requirements and a large-capacity front-mounted generator to handle your electrical load.

Only Cat Diesels can take full horsepower from the front! On your next diesel purchase, take advantage of the strength and versatility of a Cat Diesel Engine. Over 250 quality manufacturers offer these heavy-duty diesels in crushers, washing plants, excavators, compressors, drills, locomotives and pumps. The line ranges up to 700 HP. See your Caterpillar Dealer for more complete details.

**CATERPILLAR**

Engine Division, Caterpillar Tractor Co., Peoria, Ill., U. S. A.

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**VERSATILE POWER**

**This D375 V-8 direct drives a 40" hammermill while a belt-driven generator powers conveyors, lights and welders when needed. A sister D397 V-12 replaced four engines on a nearby plant of the same Minnesota Company.**

**CONTROLLED POWER**

**Operator has control at finger tips using off-plant mounted D337 Series F two-handed power unit. Constant mechanical drive keeps crushers moving. Screens and delivery conveyors have start-stop motors. Variable speed motor on field conveyor keeps screens loaded.**

**BIG ENGINE POWER**

**This Kentucky aggregate producer traded in a number of small gasoline and diesel engines in 1956 for a Cat D397 Electric Set. Getting remote power in one package cut fuel consumption 50 gallons per day and eliminated an hour's start-up time each morning.**

# FACES & PLACES

CANDID SHOTS OF PEOPLE IN THE ROCK PRODUCTS INDUSTRY

ANNIVERSARY SURPRISE—Fred P. Curtis, president, Lyman-Richey Sand & Gravel Corp., Omaha, Neb., receives an unexpected award from employes A. P. Jones, general superintendent, and H. A. Koop, safety director, at the firm's 75th anniversary celebration.

DOWN BY THE RIVERSIDE—Allan Taylor (left), vice president, and Louis Seelbach, chief engineer, stand atop the new rising-current classifier installed at Ohio River Sand Co., Louisville, Ky. Unloading of barges takes place on river's edge beneath.

ABOVE: TOP-LEVEL WORKERS — Operator Earl Blake, left, and assistant Thomas Burns work high atop HMS plant changing screen cloth at Nashville Sand & Gravel Co., Nashville, Mich.

ABOVE LEFT: GIANT TANK—Plant foreman Frank Kafka, foreground, makes it evident just how large their new sand scalping tank is. The 8 x 32-ft. unit is principal cleaning and sizing device in the sand preparation section of Ohio Gravel Co.'s new Newton, Ohio, plant near Cincinnati.

FIRST IN SAFETY—Three men who helped establish an impressive safety record at the Centerville sand and gravel plant of Pacific Cement & Aggregates, Inc. stand on a catwalk in a complex of conveyor booms. They are Ted Olivera, Manuel Perry and George Hafery. All have worked at the Centerville plant in Alameda county since it began operations in 1949. Plant has operated 10 yrs. without a lost-time accident.

The big advantages of Taper-Lock mounting are now available for practically all of your sprocket installations. Below is listed the new wide range of types and sizes offered by Dodge!

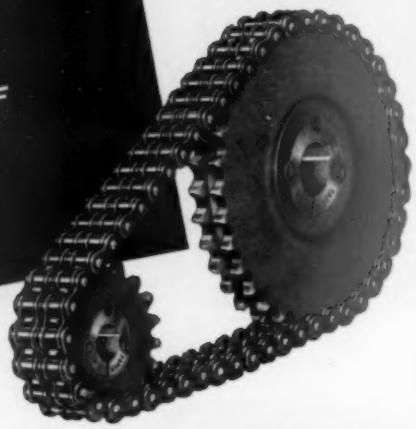
This important expansion of the Dodge line is the result of the enormous popularity of the Taper-Lock idea. Taper-Lock Sprockets are *modern*. Industry likes them because they go straight from shelf to shaft without machining—saving time. They are "easy on—easy off"—saving work. Their bushings can be re-used, not only in replacement sprockets, but in sprockets of different sizes and also in Taper-Lock Sheaves, Couplings, Conveyor Pulleys. Taper-Lock saves inventory—and money!

Dodge Taper-Lock Sprockets and Dodge Roller Chain are available through your local Dodge Distributor. Call him. Or write us for bulletin.

# TAPER-LOCK®

ROLLER CHAIN DRIVES ARE NOW AVAILABLE IN A NEW WIDE RANGE OF TYPES AND SIZES

**No Reboring!**
**No Keyseating!**
**No Waiting!**



- **DOUBLE PITCH CHAIN and SPROCKETS**
  Transmission Series (No. 2040 to 2080) and Conveyor Series (No. 2040 to 2100). Sprockets to 112 teeth—including, for the first time, stock sprockets of 17, 19, 21, 23, 25 and 35 teeth *made especially for double pitch chain.* Introduced by Dodge, these sprockets are designed for even distribution of tooth engagement and absolute accuracy of mesh. Wear is reduced by half. Life of chain and sprocket is doubled!
- **PLATE SPROCKETS**
  Steel Plate, Type A. No. 35 to 120. Mandrel bore, bored-to-size or Taper-Lock.
- **SINGLE STRAND CHAIN and SPROCKETS**
  No. 35 to 160. Sprockets to 112 teeth.
- **DOUBLE STRAND CHAIN and SPROCKETS**
  No. 35-2 to 80-2. Sprockets to 112 teeth.
- **STANDARD ATTACHMENTS**

**ALL TO ASA STANDARDS**

**DODGE**
*of Mishawaka, Ind.*

**CALL THE TRANSMISSIONEER** — your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look in the *white* pages of your telephone directory for "Dodge Transmissioneer."

**DODGE MANUFACTURING CORPORATION, 2600 Union Street, Mishawaka, Indiana**

*Enter 1421 on Reader Card*

# all-new 365-cfm GYRO-FLO

## ...a heavy-duty portable compressor with MORE POWER and MORE PERFORMANCE

Ingersoll-Rand, the pioneer builder of portable rotary compressors, now offers a completely new size Gyro-Flo portable—the DR-365. This rugged, all-new compressor provides 365 cfm of mobile air power—16% more than its predecessor, the Gyro-Flo 315. Yet, the DR-365 is no bigger than the 315 cfm Gyro-Flo, and its larger, more powerful engine retains the same 1800 RPM speed.

Take a closer look at what this all-new compressor offers: A new, simplified, more-efficient compressor system with...automatic drainage of oil from cylinders when the unit is shut down...dependable Air-Glide capacity control for 100% stepless regulation...a 12-volt battery system for faster, easier starting... side covers that fold back safely out of the way... a full-length, large capacity tool box to provide extra storage space...all operating controls, fuel tank, filters and tool storage enclosed by lockable side covers. These are just a few of the many features that mean more power, better performance, and greater convenience and safety, too.

The Gyro-Flo 365 is powered by the GM 4-71, 4-cylinder diesel engine. The Gyro-Flo 365 has a heavy-duty, spring-mounted running gear with automotive-type steering—every part built to withstand the hard service encountered on construction jobs. And remember, Ingersoll-Rand's Gyro-Flo line is complete ...six sizes that have become first choice among performance- and economy-minded construction men.

Ask your Ingersoll-Rand representative for complete information or send today for Bulletin 2932.

| DIMENSIONS AND WEIGHTS | DR-365 with Diesel Engine |
|---|---|
| **4-WHEEL MOUNTING** | |
| Weight (dry) | 5939 |
| Weight (wet) | 6640 |
| Length (less drawbar) | 10′ x 5¾″ |
| Width | 5′ x 8″ |
| Height | 6′ x 10½″ |
| Track | 56 |
| **LESS RUNNING GEAR** | |
| Weight (dry) | 5279 |
| Weight (wet) | 5980 |
| Length | 10′ x 2⅞″ |
| Width | 4′ x 9½″ |
| Height | 5′ x 2¾″ |

Ingersoll-Rand
2-959 11 Broadway, New York 4, N.Y.

AN UNBEATABLE COMBINATION...GYRO-FLO COMPRESSORS AND I-R ROCK DRILLS

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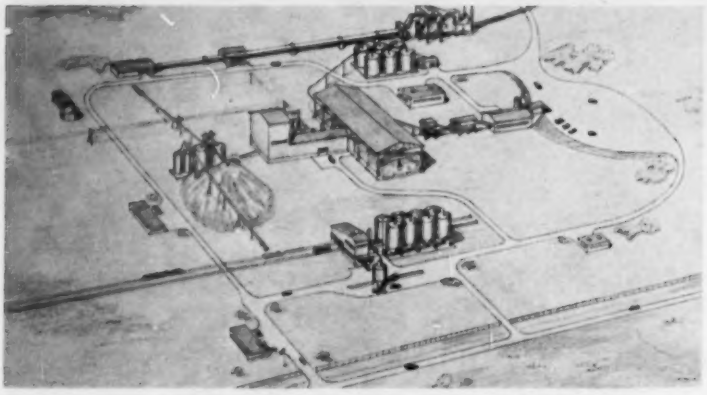
# INDUSTRY NEWS



## Oklahoma Cement, Texas Industries announce new cement plants

OKLAHOMA CEMENT CO., a newly formed corporation, and Texas Industries, Inc., have announced plans for new portland cement plants at Pryor, Okla., and Midlothian, Tex.

Oklahoma Cement has purchased the assets of the old Ozark Portland Cement Co., which started the plant in 1956 and later went into receivership, according to *Oklahoma Economic Development News*. The new firm hopes to start production by next April at the $7 million, 3,000 bbl. per day plant. The new operation is roughly 40 mi. from Tulsa, and 40 mi. from the Arkansas state line. The state's two existing plants have combined annual capacity of roughly 6.9 million bbl., according to figures available to ROCK PRODUCTS. Shipments to users of cement in the state totaled 5.1 million bbl., Bureau of Mines figures indicate.

The Midlothian plant, Texas Industries' first cement venture, will be within 30 mi. of both Dallas and Forth Worth. The 1.4-million bbl. wet-process operation is expected to be in operation by the end of 1960, will employ about 100 workers. Established in Dallas in 1950, Texas Industries has grown to the world's largest producer of lightweight aggregate for structural concrete, the firm states. The firm also makes conventional aggregates, ready-mixed concrete and concrete products. Sales in 1958 reached $17.9 million.

## Millville Quarry records 700,000 accident-free hours

ALMOST 5½ YEARS without a disabling injury—that's the safety record established by the Millville Quarry of Jones & Laughlin Steel Corp.'s Blair Limestone Div. The mark now extends for more than 2,000 days and 700,000 manhours, J&L reports.

Quarry superintendent Jack Cameron is shown holding the latest in his operation's impressive array of safety awards. It is the Certificate of Honor of the Joseph A. Holmes Safety Association, given for five years of accident-free operation. Other awards on the wall behind the smiling Mr. Cameron were awarded by the National Lime Association, Bureau of Mines, the Holmes Association and J&L.

## Construction volume and awards continue strong

PUT-IN-PLACE CONSTRUCTION in July rose 3 percent from June, and 14 percent from July, 1958, the Commerce Department estimated. It added that construction volume for the year's first 7 months was 15 percent higher than for the same 1958 months. Compared with July, 1958, building in three major sectors varied as follows in July, 1959: highways, up 5 percent to $600 million; housing, up 28 percent; and nonresidential buildings, up 7 percent.

Contract awards indicate the trend to be expected during the next few months in construction. F. W. Dodge Corp. reports this picture in contract awards for last June: housing up sharply, by 29 percent from 1958; nonresidential buildings, up 8 percent; and heavy engineering, down sharply, by 43 percent from last year. Highway and airport contracts awarded in June were down sharply, Dodge announced, partly because of "last year's abnormal speed-up as a recession-curing device." (Portland Cement Association figures show that concrete road and airport contracts awarded dropped by 34 percent in July, from July, 1958.) Another reason for the drop was uncertainty of state highway officials on a new Interstate highway financing bill in Congress.

## Standard Lime & Cement opens Richmond office

STANDARD LIME AND CEMENT CO., Baltimore, Md., announces the opening of a district sales office in Richmond, Va., to serve Virginia and North Carolina. The subsidiary of American-Marietta Co. is a major supplier of portland cement, masonry cement and finishing lime in the Mid and South Atlantic states.

Russell R. Reid, Jr., who has represented the firm in Richmond for the past several years, was appointed district sales manager August 1.

*(Continued on page 48)*



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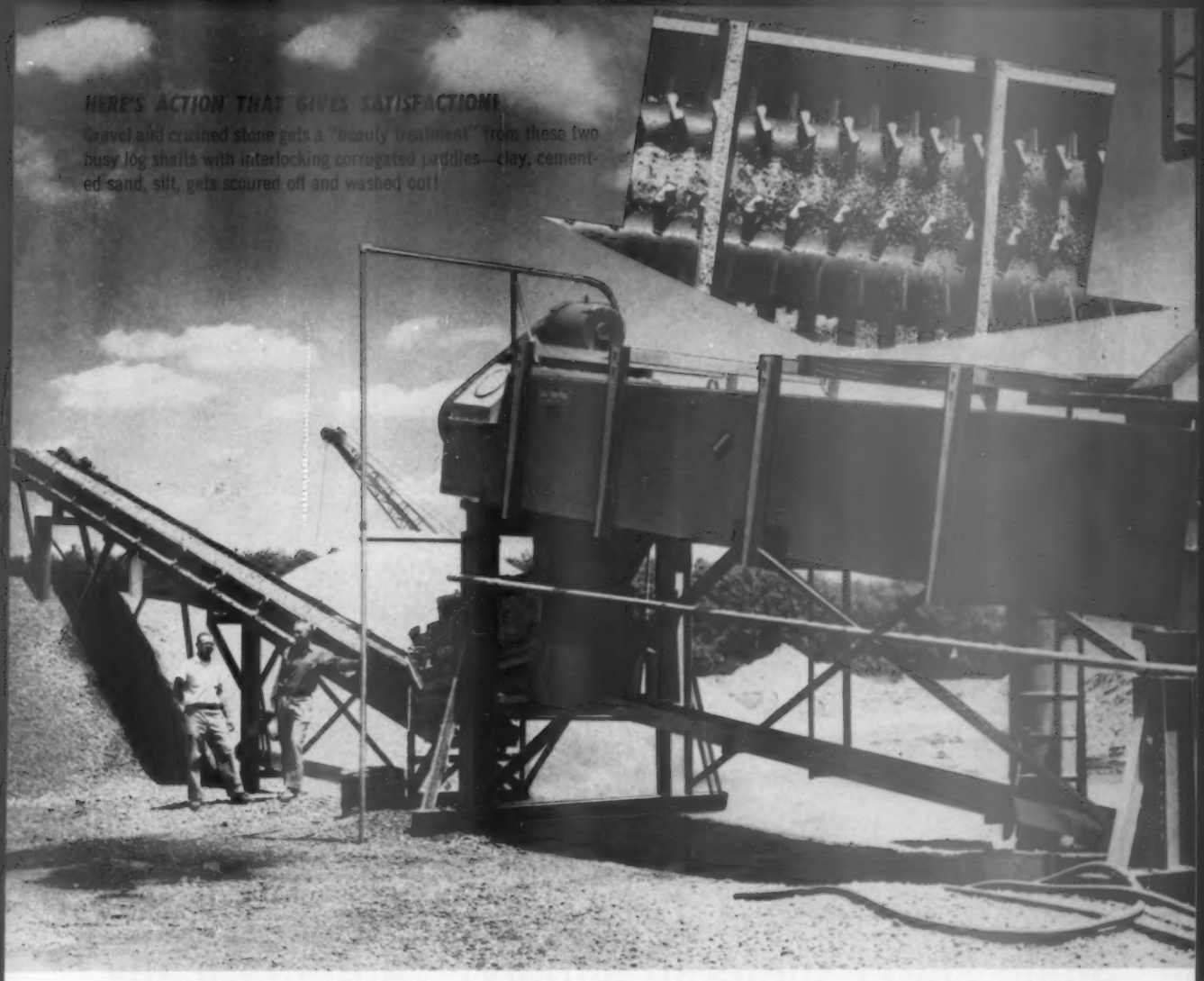

HERE'S ACTION THAT GIVES SATISFACTION!
Gravel and crushed stone gets a "beauty treatment" from these two busy log shafts with interlocking corrugated paddles—clay, cemented sand, silt, gets scoured off and washed out!

# "Since buying our Eagle Log Washer

## WE HAVE NOT SEEN A CLAY BALL IN OUR PRODUCT"

**Walling Gravel Co., St. Johns, Mich.**

There's just no better way to wash gravel or crushed stone than with an Eagle Log Washer—we have the word of users all over north America. The Walling brothers, Bert and Bob (pictured above) are typical. They report that an Eagle Log Washer solved their problem—all clay balls removed from their gravel.

The Eagle Log Washer is way ahead in design, based on Eagle's years of experience—non-deflecting tubular steel log shafts which turn without wear common to square shafts have bolted flange stub shafts that allow easy removal—paddles with two-piece wear resistant, corrugated shoes which permit top half of shoe to be replaced when worn instead of replacing entire shoe—water lubricated marine type bearings at lower end of tub (no problems from contaminated grease)—totally enclosed compound gear drive runs in an oil bath. No wonder that Eagle Log Washers are performing so well for so many users. See why—send for Catalog 58.

SINCE 1872

EIW

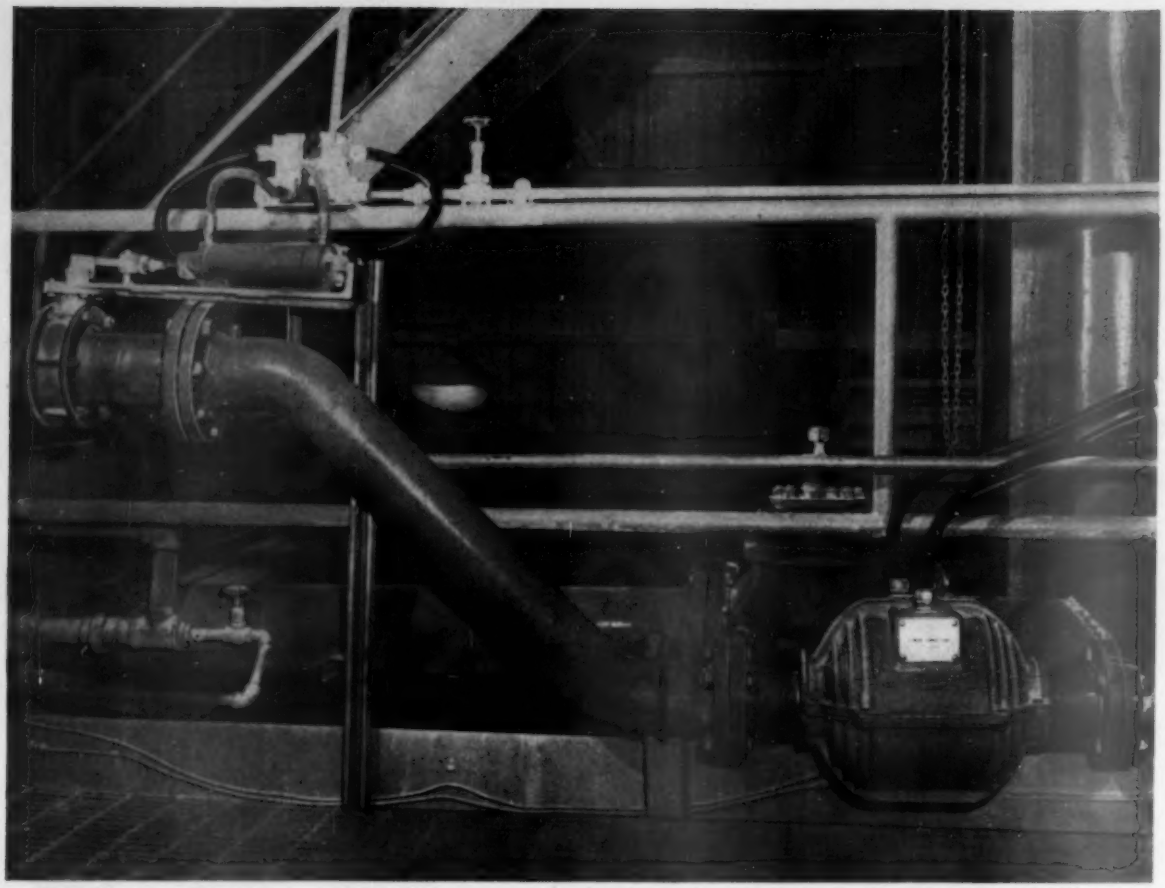
EAGLE IRON WORKS

# EAGLE IRON WORKS

ENGINEERS • MANUFACTURERS

137 HOLCOMB AVE., DES MOINES, IOWA

Factory-Trained Distributors *Everywhere*



**Missouri Portland Cement Company** automatically measures and controls additions of shale slurry to kiln feed with this 3" Foxboro Magnetic Flow Meter. Since installation in 1956, only minor servicing and inspection have been required to insure continuing accuracy.

# Shale slurry metered simply... automatically

## with Foxboro Magnetic Flow Meter

**Operator sets** amount of shale slurry to be added, then pushes "start" button. Foxboro Dynalog Recorder (at left) records and totalizes flow passing through Magnetic Meter. When desired amount of shale has been added, control valve closes — automatically.

"We used to ratio shale slurry by manually operating a pinch valve and spot checking the flow rate," reports Missouri Portland Cement Company, St. Louis, Mo. "It was inaccurate and time-consuming."

"Now our Foxboro Magnetic Flow Meter does it automatically. And, after a 30-day continuous check of volumes, we found its accuracy to be ±0.2% — assuring us that our rigid requirements for kiln feed batches would be met."

Foxboro Magnetic Flow Meters are ideal for measuring industry's most difficult fluids. Installed as simply as a length of pipe, they have no pressure taps to plug up . . . no orifice plates to clean . . . no line restrictions of any type. Instead, electrodes, flush-mounted in the meter wall, sense the flow rate and transmit it to a remote Dynalog* Electronic Recorder. Measurement is linear and continuous.

There are literally *hundreds* of Magnetic Flow Meters in operation today—metering almost every type of liquid except hydrocarbons. Get full details by writing for Bulletin 20-14C. **The Foxboro Company,** 8310 **Neponset Ave., Foxboro, Mass.**

*Reg. U. S. Pat. Off.*

**FOXBORO**

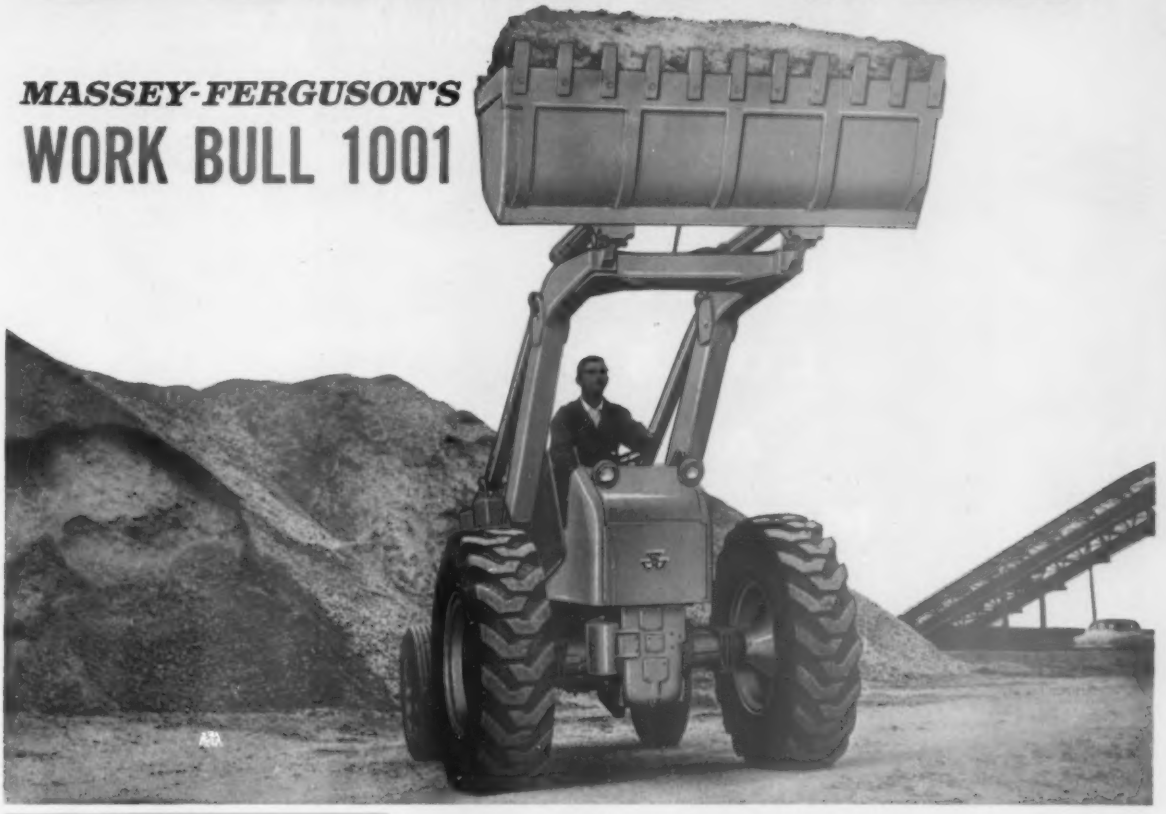
REG. U.S. PAT. OFF.

**MAGNETIC FLOW METERS**

*Enter 1478 on Reader Card*

# COMPARE-

## *MASSEY-FERGUSON'S* WORK BULL 1001



## against any Tractor Shovel in its class!

☆ **EXCLUSIVE INSTANT REVERSING**—Change direction of travel — either forward or reverse— at a touch of your toe — no shifting . . . no clutching . . . no levers to pull. Shortens cycle time between load and dump.

☆ **PERFORMANCE**—— One cubic yard SAE rated capacity, 43° rollback at ground level, direct-line thrust, torque converter, power steering, maximum visibility, five equal speeds forward and reverse add up to greater on-the-job performance.

☆ **VERSATILITY**—A full range of perfectly matched attachments include a combination Davis Backhoe-backfill blade, asphalt spreader, pick-up street sweeper, rotary boom, angle dozer, crane, fork lift, scarifier, and a variety of buckets.

☆ **QUALITY**—Designed and manufactured for rugged construction and industrial applications. Has strength built-in and quality in every part.

**Yes, we invite you to compare Massey-Ferguson's Work Bull 1001 against all the rest. You'll soon be convinced of its superiority . . . of its profit-making and time-saving advantages on the job. You'll see why it can outperform costly, single-purpose machines. Ask your Massey-Ferguson Industrial Dealer for a demonstration.**

***Why Wait? Set a Date — We'll Demonstrate!***

MASSEY-FERGUSON
INDUSTRIAL DIVISION
*Block 1000 South West Street • Wichita 13N, Kansas*

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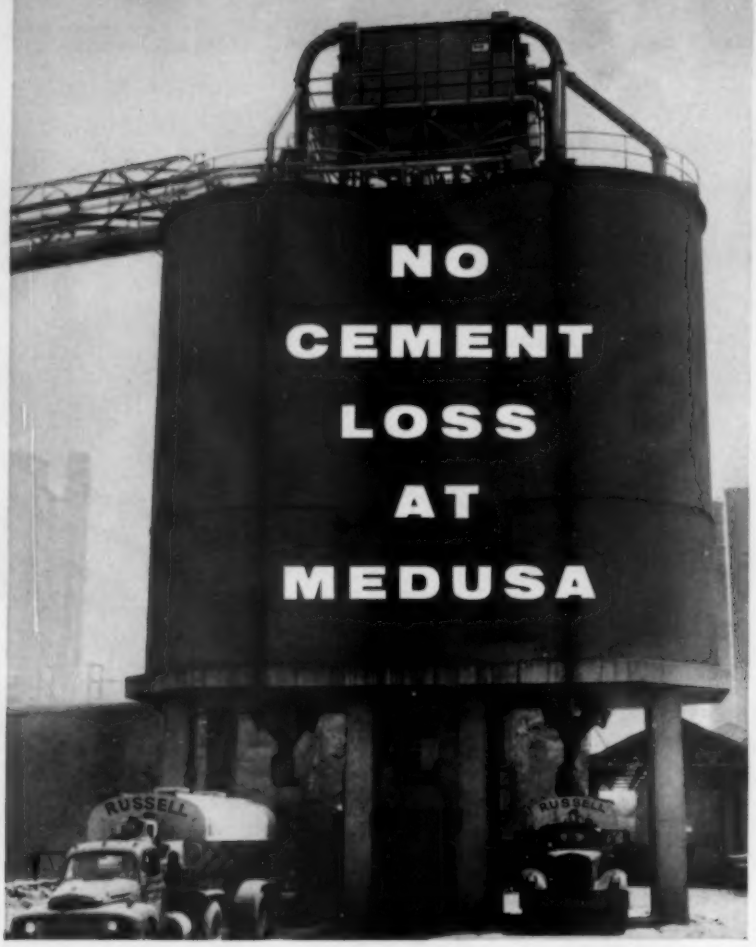
# SLY DYNACLONES...




**Are your bulk-loading stations as dust-free as this?** They can be, and your cement savings can compare with those at Medusa Portland Cement Company, Wampum, Pa. The two Sly "Roll-Clean" Dynaclone Dust Filters pictured save 120 pounds per hour during truck loading, and 240 pounds per hour during silo loading.

The "Roll-Clean" Dynaclone maintains constant, uniform suction at dust sources to collect *all* the dust. It has a new roller cleaner for simplified automatic self-cleaning. And it is now available with new "Resist-O-Wear" filter bags (patent pending) that give as much as 3 times longer life.

*Get the complete Dynaclone story...*
*Send for 36-page Catalog 104*

SINCE 1870 SLY

*SEE THE DYNACLONE in Space 73, the Chemical Show, New York Coliseum, Nov. 30-Dec. 4*

**THE W. W. SLY MANUFACTURING CO.**

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OVERSEAS LICENSEE: ANDREW AIR CONDITIONING LTD., LONDON S.W. 1, ENGLAND

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*(Continued from page 44)*

## Rock firm sales indicate outstanding industry year

INTERIM FINANCIAL REPORTS from rock firms in many parts of the nation continue to indicate record or near-record sales for most industry firms. While uncertain as to the picture for the second half in highways and housing, most companies look for the year as a whole to be outstanding.

| Company | First-half sales (millions) | Gain over last year |
|---|---|---|
| American Cement | $ 25.6 | 13.5% |
| Consol. Rock Products | 13.9 | 23. |
| Johns-Manville | 176.3 | 17.1 |
| Lake Ontario Portland | 1.2 | — |
| Permanente Cement | 37.4 | 34. |
| Warner Co. | 16.4 | 62. |

## Soil-cement and lime stabilization discussed

AMERICAN ROAD BUILDERS' Association has issued two technical bulletins describing markets newly important to rock operators—soil cement and lime stabilization.

Bulletin 242 gives construction experiences of highway engineers using soil cement in Orange County, Calif., and at Greenville, Tex. Orange County turned to soil-cement partly because of a shortage of good rock aggregate and it is saving money on many jobs ($300,000 saved on a 3.3 mile job this year). List price of the bulletin is $.50.

Bulletin 243, "Lime Stabilization Construction Manual," is the first published, ARBA reports. The 36-page manual is based on a survey of highway engineers and contractors experienced with this method of road base construction. Cost is $1. Both publications are available from the association, at World Center Building, Washington 6, D.C.

## June cement shipments up 19 percent over 1958

BUREAU OF MINES reports that shipments of portland cement from U. S. mills were 36.1 million bbl. in June, a gain of 19 percent over June, 1958. Production, at 33.4 million bbl., was 100 percent of rated capacity, the bureau reports.

Figures for the first 6 months of 1959 are just as encouraging. Shipments were up 18 percent over the first half, 1958, to 151.4 million bbl. At 155.6 million bbl., production of portland cement for 1959's first half was about 78 percent of rated capacity.

*(Continued on page 50)*



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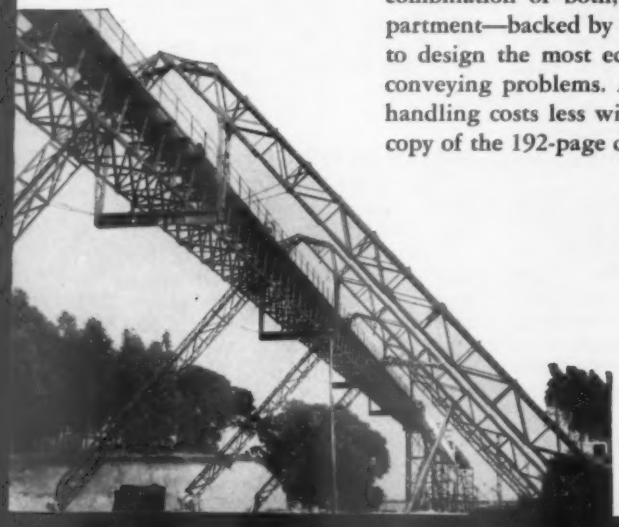
# HEAVY DUTY SAVINGS for your HEAVY DUTY JOBS

## with Barber-Greene specialized engineering

Whether your heavy-duty jobs call for all standardized components, all specially designed components, or a combination of both, Barber-Greene's engineering department—backed by 40 years' experience—stands ready to design the most economical answer to these special conveying problems. Any way you look at it, material handling costs less with Barber-Greene. Write for your copy of the 192-page conveyor catalog.

New Barber-Greene Heavy-Duty Idlers handle heaviest materials at high speeds. Heavy steel end brackets ribbed for maximum strength. Revolutionary grease seals most advanced in the industry.

59-16-PE



Representatives in Principal Cities of the World

**Barber-Greene** BG

Main Office and Plant AURORA, ILLINOIS, U. S. A.

Plants in DeKalb, Illinois..Detroit..Canada..England..Brazil..Australia

# RECOGNIZE THIS LOT?

**It's the lot of a Caterpillar Dealer, one of over 300 in the U. S., offering you the best buys in used equipment!**

No matter what you want in used equipment, no matter what the price range, your Caterpillar Dealer is headquarters for your best buy. No other dealer offers you "buys" with this protection:

**1** **A "BONDED BUY"** up to $10,000 on used Cat-built equipment—your guaranteed assurance of satisfactory performance on *all* parts of the machine during the guarantee period.

**2** **A "CERTIFIED BUY"**—his written guarantee covering units of any make.

**3** **A "BUY AND TRY"** deal—his written money-back agreement on units of any make.

For the best buys in your area, to be *sure* of what you're buying, see your Caterpillar Dealer. You'll find him listed in the Yellow Pages!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

**CATERPILLAR**

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BEST BUYS IN NEW AND USED EQUIPMENT

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*(Continued from page 48)*

## Bureau of Mines issues 1958 cement production report

PRODUCTION OF PORTLAND CEMENT in the U. S. last year came within 2 percent of equaling the 1956 record of 312.2 million bbl. This is one of the many facts indicated in the Bureau of Mines' final report on cement production last year. Another fact disclosed: percent of production capacity used by the industry dropped last year to 77.3 percent, from the 78.2 percent figure of 1957. This despite a 4.8 percent increase in production last year, over 1957. The cause was a big gain in U. S. productive capacity during the year.

Other facts given: while U. S. cement production has risen by only 13 million bbl. since 1955 (about 4 percent), total world production has jumped by about 20 percent. Since 1955, the figures indicate, production in the U.S.S.R. has risen by 64 million bbl. (48 percent); in Red China, by 32 million bbl. (122 percent); and in Japan, by 26 million bbl. (42 percent increase).

Less coal and oil were used in the production of cement last year, than in 1957. Only 58 percent of the Btu. consumed in cement production was supplied by coal and oil last year, compared with 62.5 percent in 1957. Natural gas consumption rose 13 percent last year, Mines reports, compared with the 4 percent rise in production. Average fuel consumption last year was 1.26 million Btu. per bbl. of cement produced.

The trend to more shipments of bulk cement continued last year. The percentage rose from 76.7 to 78.3 percent in 1958, with bagged cement suffering a comparable drop. The percentage shipped by truck and rail remained virtually unchanged—34.7 percent of cement shipped went by truck last year, and 62.8 percent was shipped by rail.

Cement Industry Statistics
(thousands of barrels)

| | 1955 | 1956 | 1957 | 1958 |
|---|---|---|---|---|
| U. S. production (portland) | 293,260 | 312,204 | 292,923 | 306,609 |
| Capacity used (portland) | 94.1% | 90.7% | 78.2% | 77.3% |
| Imports to U. S. | 5,220 | 4,456 | 4,427 | 3,390 |
| Exports from U. S. | 1,795 | 1,981 | 1,331 | 641 |
| World production | 1,278,217 | 1,386,081 | 1,447,912 | 1,541,996 |

## Stone, sand and gravel firms announce plans to merge

AGGREGATE AND INDUSTRIAL SAND industries seem to be just as busy merging as is the cement industry. Here are several of the most important announced recently:

Grand Rapids (Mich.) Gravel Co. announced recently its intention to purchase Postma Gravel Co. of Grand Rapids. The announcement said preliminary agreement had been reached. The acquisition would give Grand Rapids Gravel 200 acres of Postma gravel lands and would boost the firm's truck fleet to about 80, including 55 transit mixers for ready-mixed concrete. The purchase will give G. R. Gravel more guaranteed life to its gravel lands; the firm looks ahead 25 to 30 years in this matter, executive vice president Don I. Battjes has announced.

Bedford-Nugent Corp. and Koch Sand and Gravel Co., both of Evansville, Ind., announced a $125,000 deal in which the former company bought Koch. This leaves only one sand-gravel operation on Evansville's river front, the *Evansville Press* announced.

Bedford-Nugent is headed by James L. Nugent, Sr., who has spent more than 55 years in the business. He and his son operate the firm as partners.

The two companies had adjacent river-front lands, which total 700 ft. in frontage. The purchase was expected to speed up service, with Koch equipment handling sand, and the other, gravel.

General Crushed Stone Co., Easton, Pa., recently announced purchase of Lima Crushed Stone Corp., Mount Morris, N.Y. Sale price reportedly was more than half a million dollars. General has quarries and blacktop plants in the states of New York, Pennsylvania and Delaware.

## List tips for small business

"PROFITABLE MANAGEMENT for Main Street" is a small business handbook now available from Dun & Bradstreet. The interesting book contains 12 short case histories describing solutions to typical problems the small businessman encounters. For single copies, send $1 to Dun & Bradstreet, Inc., 99 Church St., New York 8, N. Y.

*(Continued on page 53)*



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## Special report to Caterpillar D8 Tractor owners:

CAT CATERPILLAR

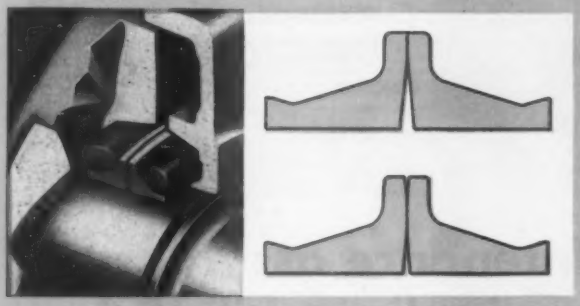
Parts you can trust.
Dependable round-the-clock service.

# NOW—YOU CAN EQUIP YOUR D8 WITH LIFETIME LUBRICATED ROLLERS

**AVAILABLE FOR 2U, 13A, 14A AND 15A MODELS**

**Forget about lubrication . . . and seal replacement.** They're eliminated by this new concept in roller design and performance. The new lifetime lubricated rollers are lubricated when installed on your tractor. They'll never need lubrication until the rollers are disassembled for rim and flange rebuilding. The seals do not leak even after thousands of hours of operation. Seals won't need replacement when rollers are rebuilt. Another advantage—*oil* lubricant rather than grease is used because oil dissipates heat faster. Rollers operate at cooler temperatures. Bearings last longer.

**New floating ring seal . . . wear does not decrease efficiency.** The roller seal employs two metal alloy and two rubber "O" rings. The metal rings, much harder than file steel, have



lapped faces . . . smoother than glass. These faces taper slightly toward the inner edge forming a sealing area at the outer edge. As wear occurs, the sealing area moves inward, maintaining a perfect seal through thousands of hours.

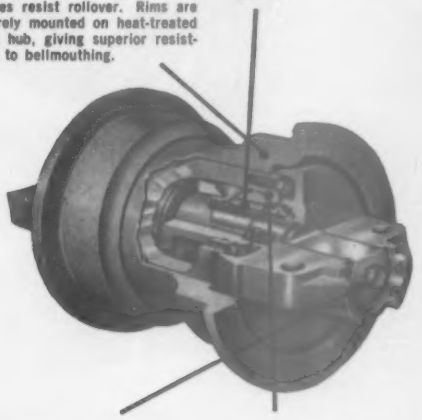
The "O" rings keep constant pressure on the metal rings. Lubricant can't get out. Grit can't get in. There are no springs or diaphragms to weaken, wear or become damaged. "O" rings are made of special compound to resist oil, heat and cold.

**Millions of hours of proof—the toughest track roller yet.** Cat lifetime lubricated rollers have been subjected to extensive and exhaustive on-the-job tests *for over 5 years*. Working under all types of job conditions, these time-tested rollers have proven unequalled. Their success is further amplified by new machine owner reports—for low-cost performance and minimum maintenance, Cat lifetime lubricated rollers can't be beat.

### MANY OTHER NEW FEATURES THAT EXTEND TRACK ROLLER LIFE

**RIMS** — made from forged steel. Deep-hardened for long life. Wide flanges resist rollover. Rims are securely mounted on heat-treated steel hub, giving superior resistance to bellmouthing.

**BEARINGS** have high load carrying capacity.



**LARGE DIAMETER SHAFT** is double heat treated, making it extra stiff and resistant to wear.

**BUSHINGS** contain large oil reservoirs for more lubricant and better cooling.

**Easy installation** is achieved by use of snap rings to hold the seals and end collars in position before mounting. End collar bolt holes will line up easily with track roller frame holes during installation.

**Stop track roller greasing now with these lifetime lubricated rollers.** See your Caterpillar Dealer. He will give you the complete story on this time-saving, money-saving undercarriage component.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

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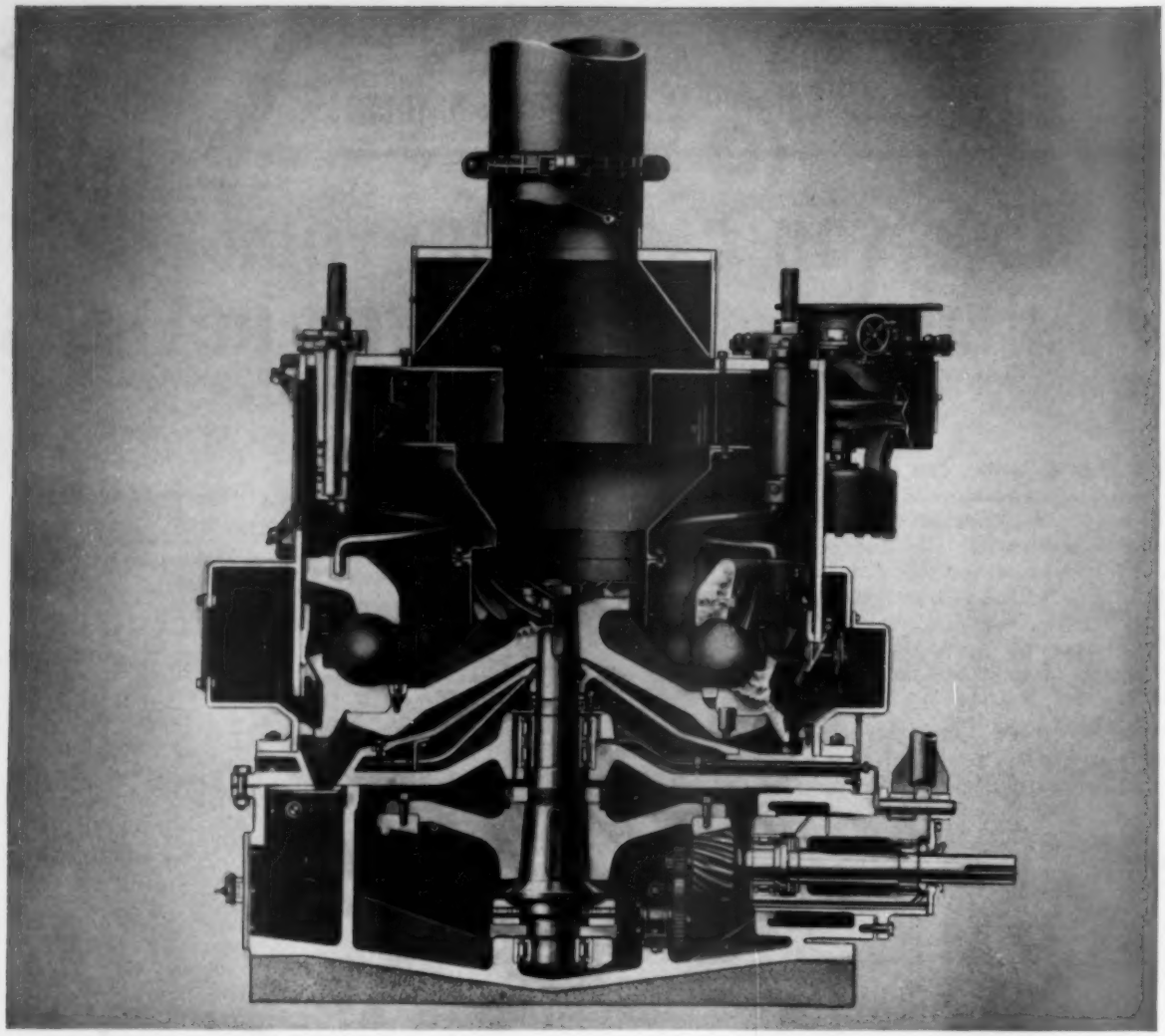
**SERVICE TIP:** When rebuild time finally comes, be sure to keep the metal rings matched in original pairs, being careful not to nick or mar the lapped faces.



# Low pulverizer maintenance assures long continuous operation in direct kiln firing

B&W Pulverizers for the direct firing of rotary kilns are engineered and built to give long, uninterrupted service with minimum maintenance. The pulverizer is compact, self-contained, and fully enclosed. Grinding elements are made of long-life, special wear-resistant metals, and there are no bearings or parts in the grinding zone to be lubricated. The helical reduction drive with anti-friction bearings is isolated completely from the dust and high temperatures of the grinding zone. Lubrication is automatic. The result—less wear and tear on vital operating parts—and less maintenance.

No dismantling of pulverizer or piping is necessary during scheduled shut-downs to replace grinding elements. Large, quick-opening access doors in the pulverizer housing permit speedy inspection and removal of parts.

These B&W design and maintenance features, backed by years of satisfactory performance, assure continuous, trouble-free service in modern kiln operation. Write for additional information to the Babcock & Wilcox Company, Boiler Division, Barberton, Ohio.

B&W

THE BABCOCK & WILCOX COMPANY

BOILER DIVISION

C-219

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*(Continued from page 50)*

## Gypsum, products sales up in 1958, Mines reports

PRODUCTION OF CRUDE GYPSUM rose 4 percent to 9.6 million tons last year, and the value of gypsum products made in the U. S. gained by 9 percent to $329 million. These figures are reported in a recent release of the Bureau of Mines on 1958 U. S. gypsum production.

While at midyear, crude production was running 2 percent below 1957, sales picked up enough during the second half to bring the 1958 total to 4 percent above 1957. The reason, Mines reports, was the high level of building activity in the fall of 1958. (Housing starts rose 16 percent over 1957 last year, to 1,209,000, government figures indicate.) Practically all last year's gain in value of gypsum products came in prefabricated wallboard, the report indicates. Square footage of wallboard produced rose by 17 percent to 5,050,930 million. Gypsum lath, the next most important prefabricated product, dropped slightly in production last year.

## A-N explosives on docket for Safety Council meeting

BLASTING WITH AMMONIUM nitrate explosives can be hazardous, the National Safety Council reports, because of their newness and the lack of facts on their safe use. So the Council has scheduled a discussion of these hazards for its 47th National Safety Congress, to be held in Chicago on October 19-23. Robert W. VanDolah, chief, U. S. Bureau of Mines' division of explosives technology, will lead the discussion on blasting.

Delegates to cement, quarry and mineral aggregates sessions of the Congress will also hear a talk, "Where Are We Going?," by John C. Machisak, chief, branch of accident analysis, division of safety, U.S. Bureau of Mines.

Others on the program: Ivan F. LeGore, safety director, Portland Cement Association; Lea P. Warner, Jr., director of public relations and safety, Warner Co.; and William A. Kipp, director of safety, Universal Atlas Cement Div., U. S. Steel Corp.

Some 12,500 persons are expected to attend the 5-day Congress, which will be headquartered at the Conrad Hilton Hotel.

*(Continued on page 58)*

IT TOOK A 17 TON PULL TO BREAK THIS FLEXCO® CONVEYOR BELT SPLICE!

MORE THAN 3 TIMES THE STRESS PLACED ON MOST OPERATIONAL BELTS!

Tests such as this, using belts of various sizes and construction, are part of Flexible's continual effort to improve fastener design and performance.

FLEXCO—THE PREFERRED FASTENER BY BELT MAINTENANCE CREWS! Holding power . . . ease of application . . . wearability—thoroughly tested before they ever reach the user.

QUALITY FEATURES OF THE FLEXCO DESIGN . . .

Plates have special cupped ends on top and bottom . . . distribute the strain over entire plate area.

Teeth are spaced for best holding action.

Precision-made bolts and nuts.

FOR SPLICING, and REPAIRING RIPS and TEARS . . . ON NEW and WORN BELTS!

(Full details on this Test available on request)

ORDER FROM YOUR DISTRIBUTOR, OR WRITE TO US FOR BULLETIN F-112.

"FOR THE SPLICE OF A LIFETIME"

Flexible STEEL LACING COMPANY

4684 LEXINGTON STREET • CHICAGO 44, ILLINOIS

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CATERPILLAR'S **No. 1** PROJECT

*PAYS OFF FOR YOU AGAIN**

# New Cat Power Shift Transmission for D9 and D8 Tractors

**CONTROL** is mounted to the left of the operator. One selector lever eliminates gearshift, forward-reverse and flywheel clutch levers. The safety lever prevents accidental transmission engagement. The selector lever moves in a "U" path to various positions. To the left are three reverse speeds. To the right, three forward speeds. To change speed, simply move lever to the required position. To change travel direction, move lever to the opposite side. Changing speed and direction are as easy as that—without clutching—changes can be made while the machine is in motion under full load without loss of power or momentum.

**HIGHER PRODUCTION PUSHLOADING:** Power is quickly, easily adjusted to meet the demand. Shifting to higher gear boosts scraper out of cut quickly at higher speed. Speedy reverse quickly positions machine for next push.

**HIGHER PRODUCTION BULLDOZING:** As material builds up, Cat power shift transmission permits split-second shifting. There's a minimum of forward surge when the load is dropped. Instant reversing further slashes cycle time.

- **Shifts on-the-go under full load in a split-second!**
- **Changes speed, reverses direction with finger-tip control lever—and no clutching!**

The wraps are off—it's ready. After many years of research and on-the-job testing, Caterpillar now offers a revolutionary new drive for Cat D9 and D8 Tractors—power shift transmission. This new transmission—with an exclusive design—provides production highs never before possible with a track-type tractor. Here's why:

1. It combines for the *first* time the flexibility and anti-stall features of torque converter with the operating snap of direct drive. Because of its direct drive characteristics, it is more efficient than other power shifts.

2. With one control lever and no clutching, it reverses direction . . . changes speed . . . smoothly . . . under full load . . . in a fraction of a second.

Talk about productivity—the Cat power shift transmission delivers in a big way. Split-second on-the-go shifts give plenty of power in the highest gear possible. Shifting is so easy the operator just naturally gets more work out of the tractor. What's more, he gets it on the toughest, most demanding track-type jobs.

Besides the power shift transmission, you also have your choice of direct drive or torque converter in the D9 or D8. For complete facts on the new Cat power shift transmission see your Caterpillar Dealer. He's ready to explain in detail how it works, or to demonstrate its ruggedness . . . its ease of operation . . . its productivity. Name the date—he'll demonstrate!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

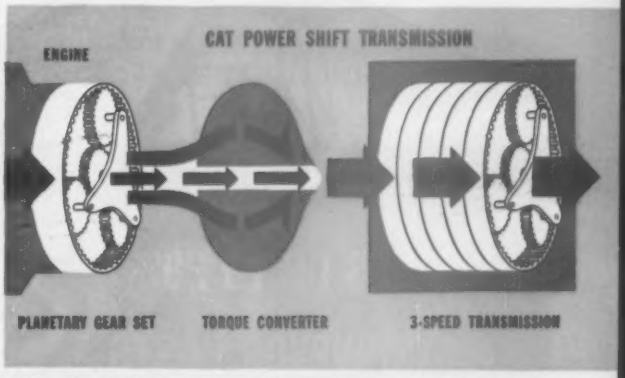
# CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

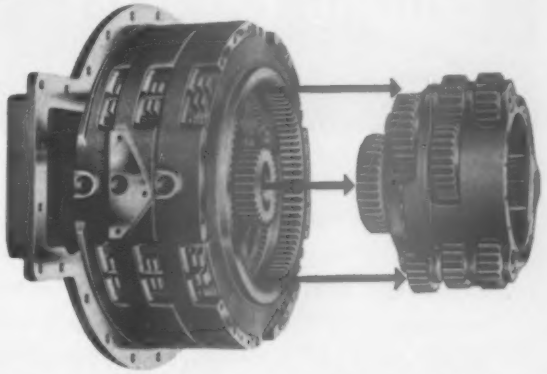
**DIESEL ENGINES • TRACTORS • MOTOR GRADERS**

**EARTHMOVING EQUIPMENT**

**BORN OF RESEARCH**
**PROVED IN THE FIELD**




**BASIC DESIGN:** Total power is transmitted from the engine to a planetary gear arrangement mounted in the engine flywheel. The planetary divides and directs the total power—part goes through a direct drive shaft straight to the transmission and the remainder through a torque converter to the transmission. This enables the Cat power shift transmission to combine the snap and positive operating feel of direct drive with the anti-stall and flexibility features of torque converter drive. Its clean, unit construction design makes it easy to service, when required.



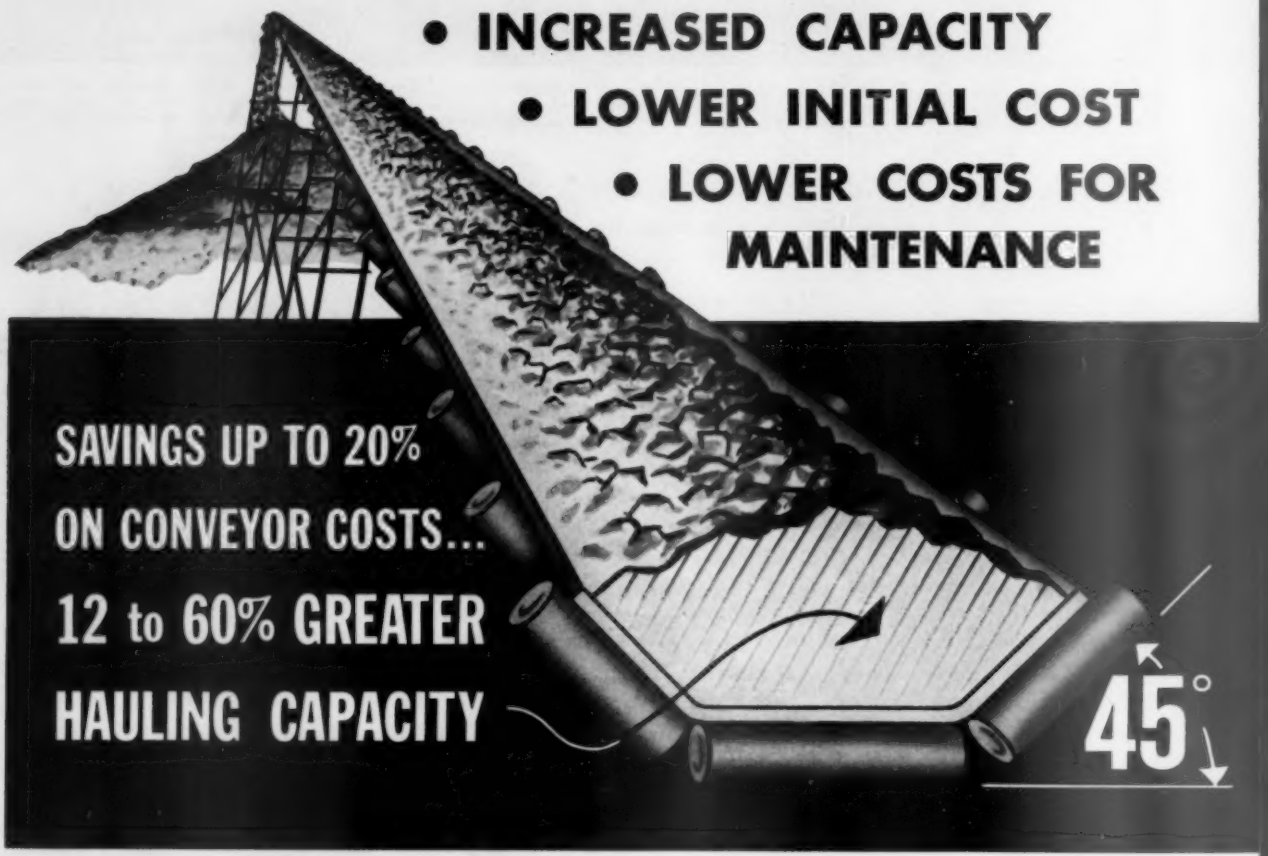
**ONE TON OF RUGGEDNESS:** Here's a portion of the components that make up the new Cat power shift transmission. Designed and built specifically by Caterpillar for its giant tractors, this rugged transmission weighs well over a ton. Every component is constructed for long-lived service. Selected alloy steel insures a transmission that stands up under the toughest conditions. Equally important, Cat power shift transmission comes to you thoroughly tested by exacting design and demanding field work in the heaviest earthmoving duty.

***CATERPILLAR'S NO. 1 PROJECT:** A multimillion-dollar research program—to meet the continuing challenge of the greatest construction era in history with the most productive earthmoving machines ever developed.

# MOST IMPORTANT NEWS

## NOW YOU CAN USE 45° IDLERS

- INCREASED CAPACITY
- LOWER INITIAL COST
- LOWER COSTS FOR MAINTENANCE




It's a mathematical certainty that a belt can haul bigger loads with 45° idlers than with regular 20° idlers. But the 45° angle between concentrating idlers and bottom roll idlers is too sharp for an ordinary heavy duty conveyor belt. Plies separate, but modern RAY-MAN CONVEYOR BELT licks this problem . . . for all time!

Ray-Man's exclusive flexible construction and built-in stress compensation is guaranteed to take the sharp angle of 45° idlers without ply or cover separation at the hinge line. This opens a whole new era of conveyor design . . . permitting larger loads . . . narrower conveyors . . . assuring longer cover wear . . . lower handling costs!

**RAY-MAN GIVES YOU "*MORE USE PER DOLLAR*" WITH 45° IDLERS**

# IN CONVEYING TODAY!

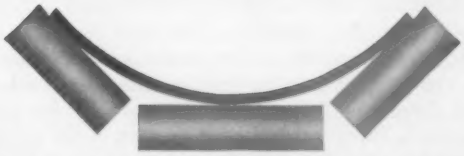
## ...TO HANDLE ALL MATERIALS

BIGGER LOADS, LESS SPILLAGE, LESS WEAR ON COVER WITH 45° IDLERS

20° IDLERS REQUIRE WIDER CONVEYOR TO HAUL SAME TONNAGE

## *Only* RAY-MAN CONVEYOR BELT is BUILT to take the EXTRA STRESS OF 45° IDLERS

RAY-MAN IS GUARANTEED NOT TO PLY-SEPARATE AT 45° ANGLES



ORDINARY PLY BELTS ARE TOO BOARDY TO TAKE 45° ANGLES

Ask your R/M representative to show you how Ray-Man Conveyor Belt with 45° idlers can give you the most for your conveyor dollar ... write for new Bulletin M303, "Ray-Man for 45° Idlers."

**RAYBESTOS-MANHATTAN, INC.**
MANHATTAN RUBBER DIVISION, PASSAIC, NEW JERSEY

RM

RM-661
ENGINEERED RUBBER PRODUCTS ... MORE USE PER DOLLAR

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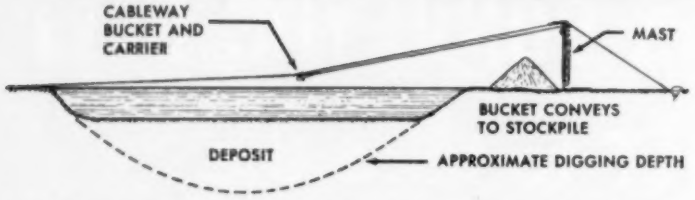
# The Best Method for Digging Under Water is a Sauerman Slackline Cableway

*. . . R. W. Bisett, Pres., Olean Gravel, Inc.*




A Sauerman Slackline Cableway has been excavating material for Olean Gravel, Inc. since 1930. The 1½-yd. bucket has an operating span of 1200 ft., with an average haul of 900 ft. Depth of the pit is approximately 85 ft.

Due to the long haul and digging depth, Olean uses shovels at the shore line to supplement the Slackline and maintain the 200-tph. capacity of their new plant. Mr. R. W. Bisett, President, states:

**"No one has yet come up with a better way of getting material from below the water line than Sauerman."**

During freezing winter months when the plant is not operating, the Slackline Cableway is kept running to build a stockpile of material. A 110-ft. mast permits building the pile to a height of about 75 ft. All digging, elevating, conveying and dumping operations are handled by the hoist operator. Gravity return of the bucket to the excavation completes the fast operating cycle.

Where long range excavation or deep digging is required, it pays to use a Slackline Cableway. Contact Sauerman for specific recommendations on your job. Catalog C, *Slackline Cableways*, gives more information on this materials handling method.

**SAUERMAN BROS., INC.** 630 SO. 28th AVE. BELLWOOD, ILL.
Linden 4-4892 • Cable CABEX–Bellwood, Illinois

Crescent Scrapers • Slackline and Towline Cableways • Durolite Blocks

*Enter 1424 on Reader Card*




*(Continued from page 53)*

## Construction continues far above 1958 pace

SPENDING FOR CONSTRUCTION ran at 15 percent above the 1958 level for the first six months of 1959, the Departments of Commerce and Labor report. Here are recent reports on segments of the construction industry:

**Housing** showed the most spectacular gains, with dollar volume 32 percent above the first six months of last year. And since housing accounts for roughly 40 percent of the total amount spent for new construction, it was the major factor in pushing all construction volume to new highs (expected to total $56 billion this year). Many experts feel that President Eisenhower's recent veto of the housing bill will not seriously hamper the Federal Housing Administration's ability to make housing loans.

**Highway building,** the other big gainer during the year's first half, recorded a 17 percent rise over the first half, 1958. Indication that the level should continue high: On the Interstate system, 5,150 miles are now being built or advertised for bidding, while only 3,800 miles have been completed in three years since the system was authorized. A sobering note: Contracts let for concrete roads and streets during the year's first six months slipped slightly from last year.

Bright notes on the building horizon: **Educational buildings** will have to be built at an increasing rate, for the number of school-age children will rise 21 percent by 1963, according to the Bureau of the Census. F. W. Dodge Corp. reports that the corner has been turned on slumping construction of **industrial plants.** Contracts awarded for new industrial buildings were up 89 percent during June from the same 1958 month, Dodge reports.

## NCSA publishes booklets on sales, operating problems

NATIONAL CRUSHED STONE ASSOCIATION again this year has published its "Discussion of Operating Problems" encountered by producer members. The 68-page handbook has outstanding discussions on two subjects: measuring quarry efficiency and ammonium nitrate explosives. Cost is $2.

This year something new has been added—a counterpart for the sales side of the crushed stone business.

*(Continued on page 60)*



*Enter 1425 on Reader Card*

**Can your loader "lift its lip" and duplicate dozer action? No?**

Then trade it off without delay! Because you'll miss money-making opportunities right and left without this big-capacity 4-in-1 action. And you have positive "radius control" of dozing depth; plus strength for hard digging! Here, the new International Drott TD-20 4-in-1 is dozing heavy gumbo material like a full-size blade!

**Can your loader grade and strip like a carry-type scraper? No?**

Then consider what extra service—and extra-valuable service you would have—with versatile scraper-like action at your fingertips with a moderately-priced 4-in-1! This TD-20 4-in-1 is stripping sticky clay. It can also grade or spread materials with similar accuracy.

# ONLY A CLAM-ACTION 4-IN-1

# *can replace up to $100,000 of limited-duty equipment!*

**Can your loader "bottom-dump" and handle sticky materials? No?**

Then retire the "relic" and go modern! You can't choose the materials you excavate. You can't prevent adverse weather that makes materials sticky! But 4-in-1 bottom-dumping eliminates the sticky materials problem and gives you a vital dumping height plus advantage over ordinary roll-forward buckets.

**Move the selector lever**—prove to yourself only the clam-action 4-in-1 doubles for a whole spread of "big-ticket" rigs—gives instant changeovers. Compare 4-in-1 capacity and versatility to any single-action loader. Measure exclusive shock-swallowing Hydro-Spring advantages. See your International Drott Distributor for a demonstration—prove you can save up to $100,000 on equipment!

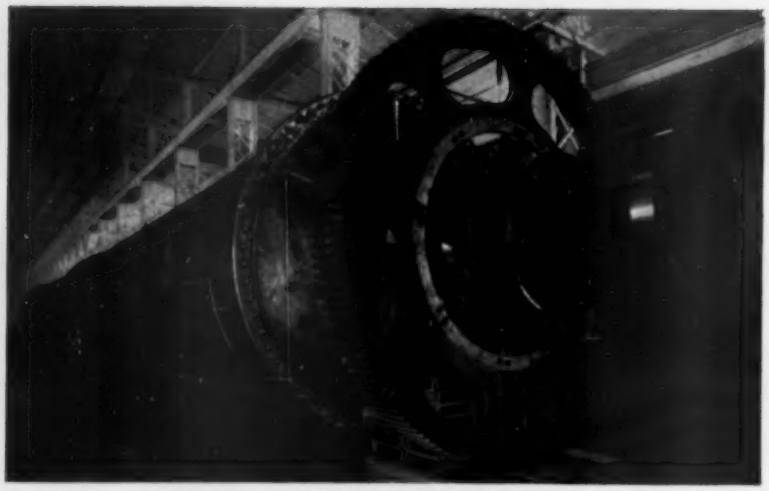
**Does your loader have measured, advertised breakout action? No?**

It's the genuine and exclusive pry-over-shoe breakout action that enables International Drott 4-in-1's to replace far costlier boom-type rigs on jobs like breaking up and loading out hard, heavy stratified or embedded materials. The NEW TD-15 4-in-1 exerts the enormous force of 39,200 lbs!

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL HARVESTER

INTERNATIONAL®
DROTT®



Ruggles-Coles

ROTARY COOLERS IN FOUR TYPES

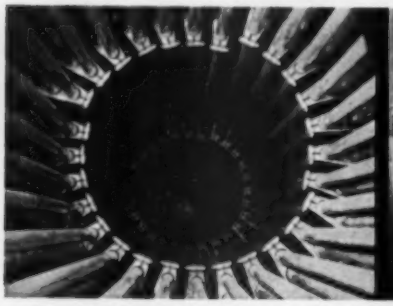
GAS-COOLED TYPE—Solids are cooled by direct contact with cooling air (atmospheric, or dried and refrigerated). Inert gases may be used in a closed system.

WATER-COOLED SHELL—Water is externally applied to the shell, either by sprays or by partially submerging the shell.

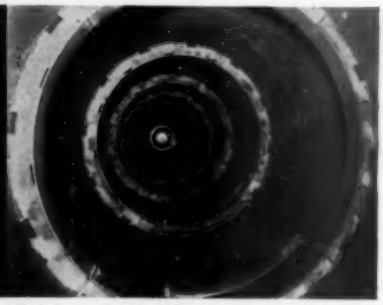
TUBULAR TYPE—Internal water-cooling tubes are assembled with the rotating shell, or installed as a stationary bank of tubes concentric with the shell. Alternately, the water leaving either of these tube sections may be used for supplemental spray cooling on the shell exterior.

DIRECT-CONTACT WATER—For rapid cooling from very high temperatures, water is sprayed directly on the hot material to utilize the latent heat of vaporization. Usually supplemented by secondary air cooling.

Each of these types has a particular area in which it is most economically applied. Write for further information.



Interior of a water-tube cooler. Longitudinal banks of tubes provide maximum cooling surface for minimum floor space.



Interior of partially-submerged cooler with gravity-controlled scrapers maintaining clean shell surface for high-rate heat transfer.

HARDINGE

COMPANY, INCORPORATED

YORK, PENNSYLVANIA • 240 ARCH ST. • Main Office and Works

New York • Toronto • Chicago • Hibbing • Houston • Salt Lake City • San Francisco • Birmingham • Jacksonville Beach

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(Continued from page 58)

"Discussion of Sales Problems," like the operating problems booklet taken from proceedings of the 1959 convention last January in Miami, has 44 pages. Major topics covered are technical service to sales, sales promotion, coordination of sales with credit, price and collection policies, and coordination of sales and production. Price is $1. Requests for the booklets should be addressed to the association at 1415 Elliot Pl., N.W., Washington, D.C.

## Lime plants announced for Louisiana, Utah

TWO NEW LIME PLANTS have been announced in Louisiana, and one near Salt Lake City, Utah. One of the Louisiana plants has been authorized for construction by U. S. Gypsum Co., and will be built beside the firm's gypsum products plant at New Orleans. It will produce high-purity quicklime and hydrated lime products from shell obtained nearby. It will serve such industries as paper, oil, sugar, petrochemicals and aluminum.

The other new Louisiana plant, to cost $1.25 million, will be built at Morgan City, out on the Mississippi River delta, by Southern Industries, Inc. It, too, will use crushed shell as a raw material.

Utah Lime & Stone Co., division of Flintkote Co., is building a million-dollar lime plant at Dolomite, Utah (near Salt Lake City), the National Lime Association reports. The Miracle lime process of G. & W. H. Corson, Inc. is being adopted.

## Depletion decision limits allowable shipping costs

PERCENTAGE DEPLETION ALLOWANCE cannot be claimed on cost of hauling to the f.o.b. pricing point, if no allowable processing takes place at destination. That is the gist of a recent Tax Court decision, as reported by the National Sand and Gravel Association.

The decision involved two firms, Winnsboro Granite Corp. and Rion Crushed Stone Corp. The first extracts monumental stone from its own quarry, hauls most by rail to a town 15 mi. away, which is its f.o.b. point for interstate shipments. The second firm quarried, crushed and sold its stone largely for highway construction and paving. Because of highway depart-

(Continued on page 64)



Enter 1440 on Reader Card

**DEPENDABLE POWER WALLOP** Jonesboro Stone Co., Anna, Ill., needed to increase production and practically powder ag lime is supplied by this International UDT-817 turbocharged diesel delivering 265 cont. hp. @ 1,800 rpm.

# Gets 25% more lime, finer screening with UDT-817 engine

Missouri farmers and farm suppliers come as far as 100 miles for agricultural lime with excellent calcium content produced by the Jonesboro Stone Co., Anna, Ill.

Demands for greater production and finer screening to satisfy Missouri farm officials caused owner Waldo Wright to make equipment changes—a bigger Cedar Rapids 40 x 33 hammermill for final crushing with a new International UDT-817 turbocharged power unit supplying 265 cont. hp. @ 1,800 rpm.

Benefits: an immediate 25% production increase from 60 to 75 tons hourly plus the ability of the new equipment to reduce 6-in. limestone rocks to 50% through a 40 screen for unquestioned product acceptance.

Waldo Wright reports, "I chose the new International UDT-817 for two reasons: 1) it came closest to the hp. requirements needed; and 2) the International engine carries better continuous horsepower than the diesel I had been using."

International diesel engines give you fastest payback power in pits and quarries for four big reasons: 1) lower maintenance; 2) full rated power; 3) unexcelled field service; and 4) genuine parts availability. Check your International Power Unit Distributor or Dealer. He can show you 10 diesels ranging from 70 to 385 max. engine hp.

**International® Construction Equipment**

**International Harvester Co., 180 N. Michigan Ave., Chicago 1**

**A COMPLETE POWER PACKAGE:** Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom-Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

CATERPILLAR'S **No. 1** PROJECT

***PAYS OFF FOR YOU AGAIN***

# Giant Series

**New power! New design! New features! Plus a new drive option—Cat power shift transmission! The result: higher production on any application!**

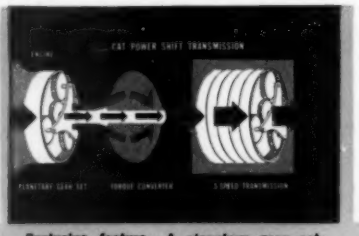
Now the "King of the Crawlers" is better than ever with new pace-setting capacity for higher, faster, lower-cost production on *any* big tractor application!

The biggest "new look" in the giant D9 Series E is the undercarriage. It's more massive . . . more rugged than ever. It'll add hours of life to running gear on even the toughest jobs. *Every* track component is new in design, highlighted by a big, new link—its pitch is increased 1¼" to 10¼"! And a new Caterpillar-developed steel alloy strengthens links, shoes, rollers *up to 40%!*

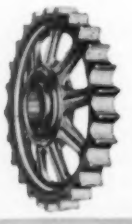
That's not all: the new D9 packs more power—335 HP. Its new equalizer bar gives greater stability on any terrain for greater operator confidence and production. A wider seat with a new spring-loaded adjustment mechanism makes the operator more comfortable, more efficient. No detail has been overlooked to make the new D9 handle heavier loads faster—and at lower operating and maintenance costs than ever.

And that's not all. Now, along with direct drive and torque converter, you have your choice of the new Cat

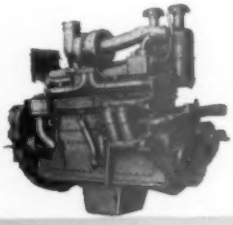
**Dry-type air cleaner.** Removes at least 99.8% of all dirt from intake air during every service hour. Can be serviced in 5 minutes. Reduces maintenance time and cost.




**Exclusive feature.** A planetary gear set splits the power from the engine. Part goes directly to the 3-speed transmission, the rest goes through a torque converter to transmission.



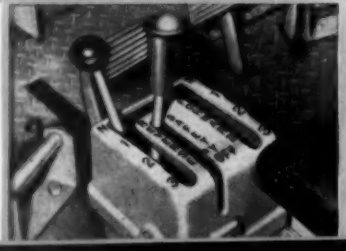
**New sprocket.** Sprocket is strengthened by new design with increased tooth thickness. Hunting tooth action provides slower wear rate.



**New 335 HP.** More powerful than ever, the D9's Turbocharged Engine has the capacity to handle bigger loads faster, with dependability, economy.

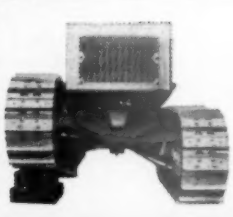
**New Turbocharger.** New, compact turbocharger packs more air into the engine. Open impeller wheel (shown below) helps prevent dirt build-up.

**New power shift transmission.** Optional on the D9. With this development you can shift **on-the-go** under **full** load with **one** lever and **no** clutching in a split second!



**New, bigger, more rugged undercarriage.** Major improvements in all track components add hundreds of hours of life to running gear—hours that mean more time on the job.

**New equalizer bar.** Greater stability. The rocking action of the bar shifts more weight to the up-hill track.



# new CAT D9 E Tractor

power shift transmission. This revolutionary transmission, tested under the most rugged conditions, combines for the *first* time the positive feel of direct drive with the flexibility and anti-stall features of torque converter. With one control lever and no clutching, it reverses direction . . . changes speed . . . smoothly . . . under full load . . . in a split second!

Many of the new features, along with some familiar retained features, are shown here. Look them over. They'll give you an idea *why* the new D9 can mean higher production and more profits for you. For complete facts, see your Caterpillar Dealer. Ask for a demonstration and watch this giant eat up the work!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR'S **No. 1** PROJECT

**CATERPILLAR'S NUMBER ONE PROJECT** A multimillion-dollar research and development program — to meet the continuing challenge of the greatest construction era in history with the most productive earthmoving machines ever developed.

**CATERPILLAR**

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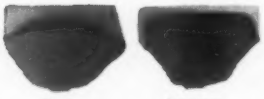
**NEW D9 SERIES E— BORN OF RESEARCH PROVED IN THE FIELD**

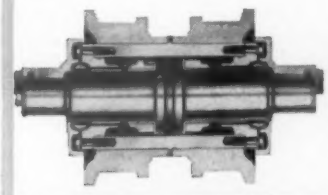


New track link — Previous track link

Light area at top indicates depth of hardening

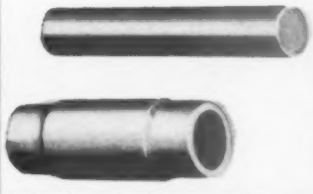
**New deep hardening steel.** Caterpillar-developed steel alloy (plus more steel in stress areas) gives up to 40% longer life to track shoes, links and rollers.

**Better visibility.** Redesigned fuel tank gives better visibility to the rear and tapered hood offers unexcelled forward vision.



**Lifetime lubricated track rollers.** Lifetime lubrication eliminates servicing problems. Oil is retained by dirt-proof, floating-ring seals.

**Stronger track shoes.** New alloy permits deeper hardening in wear areas. Grouser height is increased ⅜" for better penetration and prolonged service life.

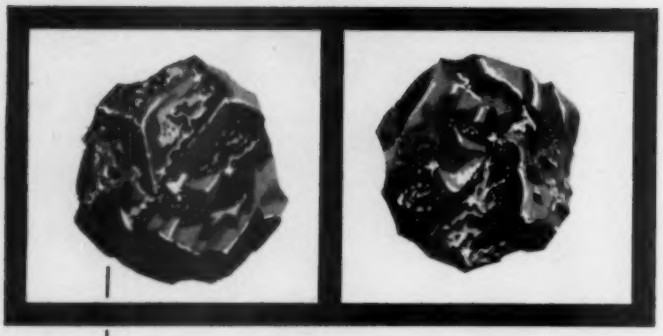


**Larger pins and bushings.** Diameters are ¼" larger. Increased size reduces deflection and provides better contact along the length of the wear surfaces.

**New foot decelerator.** Provides easier machine positioning. Allows deceleration without taking hands from controls (optional on direct drive, standard on others).

**New seat adjustment.** New spring-loaded adjustment mechanism provides more positive cushion and back rest positioning. Wider seat for more comfort.

**Bigger, heavier track links.** Strength has been added in stress areas. Pitch increase from 9" to 10¼" strengthens all track components.



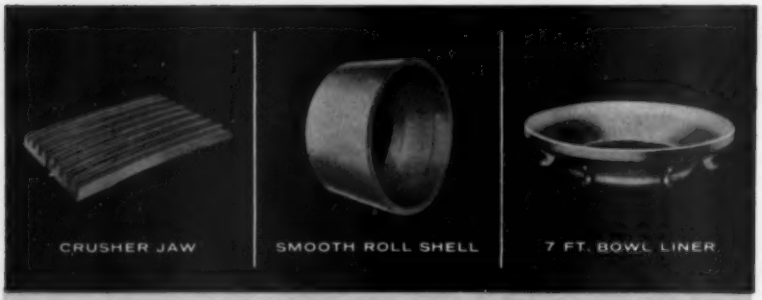
which is gold?
which is fool's gold?

You don't have to be a fool to be fooled by fool's gold. Nor do you have to be a fool to be fooled by crusher replacement parts.

In outward appearance crusher parts from different manufacturers often seem to be of equal value. Yet, the product of one manufacturer will outwear its competition by a substantial margin. That's why Columbia invites you to COMPARE Armor-Tough Manganese Steel replacement parts with those you are now using.

Compare! Order Columbia Armor-Tough crusher parts. Submit them to the "acid test" of job performance. You, too, will agree that Columbia crusher parts are the "real gold" of the industry.

Send for the new illustrated Columbia Bulletin No. 1063, featuring crusher, tractor, shovel, bucket replacement parts.




Columbia

COLUMBIA STEEL CASTING CO., Inc.
933 N. W. Johnson, Portland 9, Ore. • Ph.: CA 7-0555
Export Sales and Service is handled through Industria Americana and Company, Inc., 4131 Beverly Blvd., Los Angeles, California

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(Continued from page 60)

ment requirements, nearly all bids are made on an f.o.b.-destination basis. The Court agreed with the Government that the transportation costs were not properly part of the "gross income from the property," since in neither case was transportation necessary for further processing.

## Light aggregates group talks growth, new markets

MOST FUTURE GROWTH IN SALES of lightweight aggregates will come in the structural, precast and prestressed concrete areas, agreed producers attending the midyear meeting of the Expanded Clay and Shale Association. Those present at the June 18-19 meetings in New York City also learned that many new uses for the product are being found, including concrete floors of factories, power transmission lines and underground telephone-wire conduit.

In a few short years the block industry has "come out of the cellar" and in so doing has boosted production impressively. And while block production has doubled since 1948, lightweight aggregates have shared importantly in this growth. Other reasons for the growth of block sales: new shapes, colors and glazing effects. But lightweight aggregate producoers expect most future growth to come in the precast and cast-in-place applications. Here the accent must be on service at the job site, a discussion led by B. K. Powers, Virginia Lightweight Aggregate Corp., agreed. Architects and engineers are now quite familiar with the advantages of lightweight concrete, "but they expect and should have the fullest cooperation of the producer and the contractor in field work," Mr. Powers commented.

Promising new uses discovered for lightweight concrete were discussed in a forum led by R. G. Hardy, president of the Association and general manager of Onondaga Brick Corp., Warners, N.Y. Perhaps the largest potential new markets mentioned are: underground telephone conduits (light weight permits adding 50 percent to the size of sections), factory floors (insulating properties are known to cut worker fatigue) and power transmission poles. Straight expanded aggregate is being used in cold storage plants, as loose fill in cores of block walls, in septic tank drainage setups, and even running tracks (for humans and horses both). (Continued on page 66)



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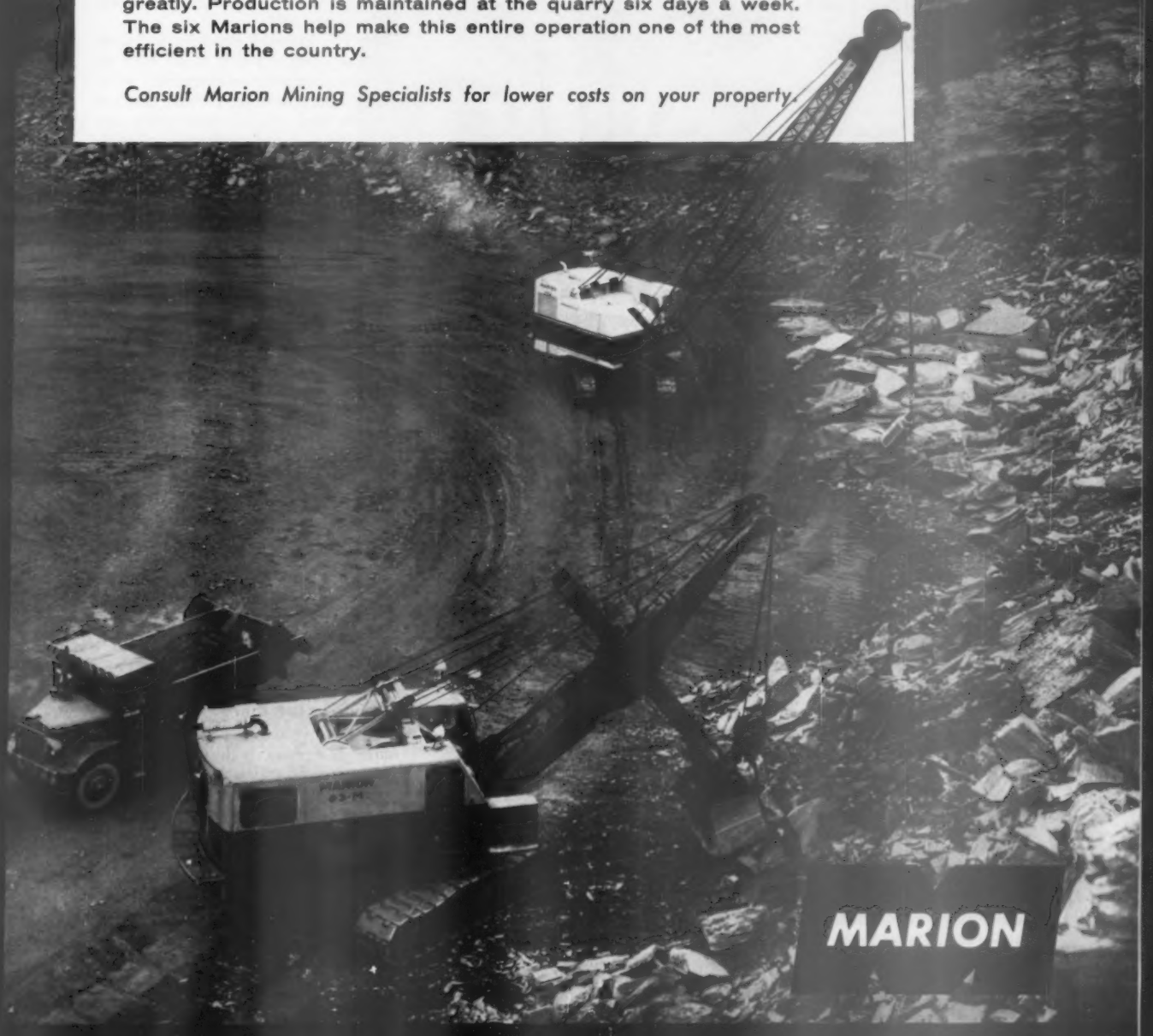
# Marions Speed Up Secondary Breakage and Loading Operations

**A team of Marions is paying off in a big way for a major cement producer. The combination of a 362 dropball and five Marion shovels, including two modern 93-Ms, breaks and loads stone for processing at three plants. With the dropball, secondary blasting is eliminated and reduction of the stone has been speeded up greatly. Production is maintained at the quarry six days a week. The six Marions help make this entire operation one of the most efficient in the country.**

*Consult Marion Mining Specialists for lower costs on your property.*




**MARION POWER SHOVEL COMPANY—MARION, OHIO, U. S. A.**

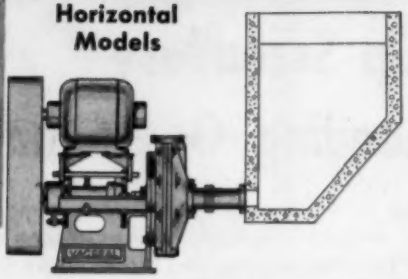
*A Division of Universal Marion Corporation*

Galigher

# PUMPS for SAND SERVICE

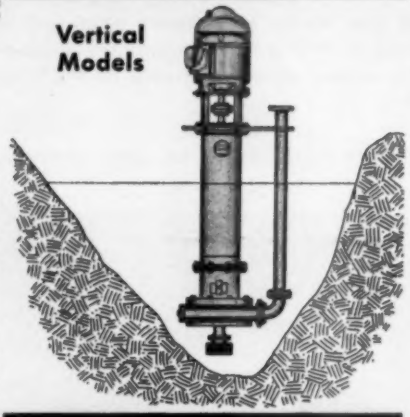
## VACSEAL PUMP

Horizontal Models



*to handle*
***DRAINAGE, TRANSFER and CYCLONE jobs in the plant***

Vertical Models

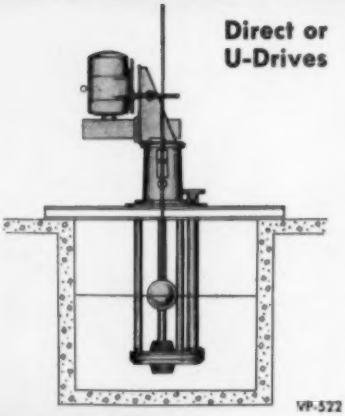


These are the basic pumps in the rugged Galigher line . . . designed to handle the variety of tough jobs found at sand and gravel plants. They have proven through years of service at mines, mills and aggregate operations that they adapt ideally . . . and with minimum upkeep cost . . . to drainage, clean-up and material handling jobs in these industries. VACSEAL PUMPS and Galigher SUMP PUMPS are available in a wide range of sizes, materials and special linings including acid-proof. There is a model to fit your specific application.

Our sales engineering staff and our experienced distributors throughout the country are available to assist you in selecting the right pumping equipment. Ask for all the details.

## Galigher SUMP PUMP

Direct or U-Drives



**Vertical VACSEAL**
Sizes — 2" x 2½" through 6" x 8"
Capacities — 50-1600 GPM
Heads — up to 100 feet

**Horizontal VACSEAL**
Sizes — 1½" x 2" through 8" x 10"
Capacities — 20-3600 GPM
Heads — up to 120 feet

**GALIGHER SUMP PUMP**
Sizes — 1¼" through 6"
Capacities — 10-1500 GPM
Heads — up to 100 feet

VP-522

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*(Continued from page 64)*

## ARBA's Prentice proves need to finance roads

LOUIS W. PRENTICE, executive vice president of the American Road Builders Association, testified before the House public works committee recently on the importance to the country of keeping the expanded highway program going at its scheduled rate. Here are some of the telling points he brought out:

1) Construction equipment makers will be hurt by the slowdown threatened due to lack of financing. About 36 percent of their sales go to the highway industry.

2) The highway program will cost more to carry out if it is not built as fast as originally anticipated. With people and businesses moving into the suburbs and exurbs, land costs are rising. Too, if the program is slowed, it will reduce the national income, and so cut the spending by highway users which makes possible taxes to build roads.

3) General Prentiss estimates that $1.4 billion can be cut from the nation's annual bill of $7.25 billion paid for property damage resulting from highway accidents. This $1.4 billion saving each year is realized because the Interstate and other controlled-access roads have far lower accident rates than roads with grade crossings. (The saving in lives from a completed Interstate network is estimated at 4,000 annually.)

4) He also quoted figures showing that the Interstate System will save $2 billion yearly in reduced costs for transportation and accidents. The American Association of State Highway Officials estimates that three years would be lost if the program isn't kept on schedule. Total dollar loss is estimated at $6 billion.

## Flintkote and Calaveras Cement plan merger

FLINTKOTE CO. has announced tentative agreement with Calaveras Cement Co., San Francisco, to a proposal under which the two firms will merge. If carried out, the merger would give Flintkote its third cement division. Kosmos Portland Cement Co., Louisville, Ky., and Glens Falls Portland Cement Co., Glens Falls, N.Y. have been acquired in the last two years.

Calaveras operates a big plant at San Andreas, Calif., with annual capacity of 4.3 million bbl. Glens Falls has annual capacity of 1.8 million bbl.

*(Continued on page 68)*

# 5 reasons why Atlas Copco's "TIGER" is best for stoping and all short-hole drilling!

***(1) It's fast and easy to handle!***

***(2) It's easy collaring, with little recoil!***

***(3) Features a retractable air leg!***

***(4) Convenient controls, automatic back head!***

***(5) Operates on single air supply!***

Here's the TIGER—a new, fast, compact rock drill with power and stamina to meet toughest drilling requirements! Its high percussion rate not only speeds penetration, but at the same time cuts recoil to a minimum. With controls conveniently located, collaring is unusually easy.

What's more, the automatic back head prevents dry collaring. Flushing water actually flows before drilling starts. And, the Tiger's "constant blowing" provision sends air through the machine the instant pressure is turned on, keeping water and cuttings from the rotation chuck.

There's still another "plus"—the Tiger's exclusive integral type pusher leg, with retractable piston rod. Operates on a single air supply!

This isn't the whole story by any means. For more facts about the amazing new Tiger rock drill and how it can speed *your* drilling, call your nearest Atlas Copco representative. Or, write to us at Dept. RP-10.

**Atlas Copco**

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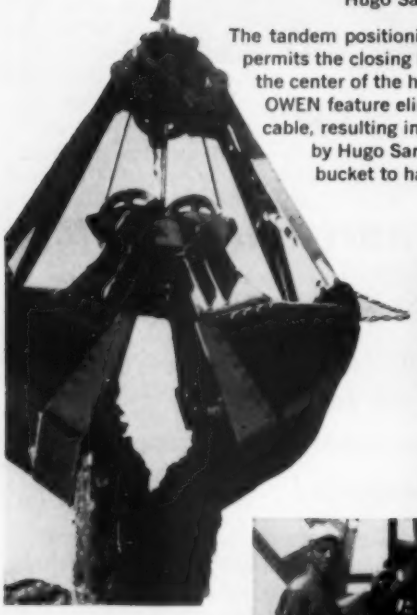
OWEN BUCKETS

## new center line reeving doubles cable life

"Our new OWEN Bucket is great. That new center line reeving more than doubles our cable life," says Kenneth Muster, Supt. for R. F. Muntz, owner of the Hugo Sand and Gravel Co. of Kent, Ohio.

The tandem positioning of the lower closing sheaves permits the closing line lead to pass directly through the center of the head of the bucket. This exclusive OWEN feature eliminates excessive bending of the cable, resulting in increased cable life experienced by Hugo Sand and Gravel. It also permits the bucket to hang plumb from the crane boom.



"Our operation is tough on a clamshell, but all these improved OWEN features have greatly reduced our maintenance costs and cut down-time," claims Mr. Muster.

This OWEN Clamshell, with all moving parts lubricated . . . with all arm and sheave pins, plus the main shaft, having triple lip grease seals . . . has heavily cut the high maintenance expense of handling this sand suspended in water that comes directly from the wash plant.

**Send us your requirements.**
**OWEN Engineers are at your service at all times.**

**The OWEN BUCKET Co.**
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BRANCHES: New York • Philadelphia • Chicago
Berkeley, Calif. • Fort Lauderdale, Fla.

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*(Continued from page 66)*

### A-M to buy Dewey Portland

AMERICAN-MARIETTA Co. plans to acquire Dewey Portland Cement Co., Kansas City, Mo., through an exchange of stock.

Dewey presently has manufacturing operations at Dewey, Okla., and Davenport, Iowa. With completion of a third plant the firm is building at Tulsa, Okla., Dewey's annual capacity will reach 7.2 million bbl.

President Waldo E. Tyler of Dewey will become a director of A-M, the latter stated. His operations will continue as an independent division of American-Marietta.

A-M previously had acquired three other cement firms, with total annual productive capacity of about 10.2 million bbl. They are the Dragon Cement Division, with capacity of 4.5 million bbl., and plants at Northampton, Pa., and Thomaston, Me.; the Standard Lime & Cement Division, with capacity of 2.95 million bbl., and a plant at Martinsburg, W. Va.; and the Southern Cement Division, with capacity of 2.75 million bbl. and plants at North Birmingham and Roberta, Ala.

### Lyman-Richey Sand & Gravel celebrates 75th birthday

**At speaker's table,** from left, are Albert R. Shiely, St. Paul gravel producer, George Bathe, head of L-R's ready mix operations, speaker Ahearn and president Curtis.

BIG LYMAN-RICHEY Sand and Gravel Co. of Omaha, Nebr., recently celebrated its 75th birthday with a banquet. Principal speaker was Vincent P. Ahearn, executive secretary of the National Sand and Gravel Association.

In a big, handsome booklet commemorating the event, president Fred P. Curtis recounts the important men and events which have made his firm so successful. Included are:

*Men.* "We believe that every person, regardless of his job, is important in

*(Continued on page 70)*

# JOB RECORDS PROVE

## Firestones keep tire costs down!

Count on Firestones to reduce your hourly costs—no matter where you work 'em! Every Firestone is job-engineered to match the punishment of the toughest jobs. They're built with Firestone Rubber-X, the longest-wearing rubber ever used in Firestone tires! Exclusive Firestone S/F (Shock-Fortified) nylon or rayon bodies shrug off bruising shock and impact. Specially designed Firestone treads and sidewalls roll through conditions that often ruin ordinary tires. Call your Firestone Dealer or Store and ask about the full line of Firestone tubeless or tubed off-the-highway tires. He'll recommend the tires that are built for your job! And, remember, Firestone off-the-highway tires are backed with on-the-job service!

Rock Grip Excavator Wide Base  Rock Grip Excavator

**When ordering new equipment always specify Firestone tires—available tubeless or tubed.**

Firestone

*BETTER RUBBER FROM START TO FINISH*

Copyright 1959, The Firestone Tire & Rubber Company

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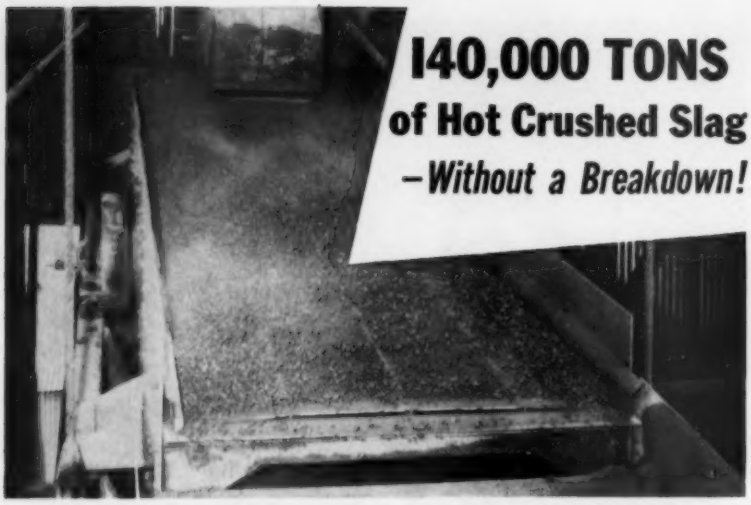

**140,000 TONS**
**of Hot Crushed Slag**
***—Without a Breakdown!***

**WITH CLEVELAND "CLELOY" SCREEN SECTIONS**

• With results like this a leading Midwestern slag plant saved money over a five-day week, 11-month period using a screen engineered to their requirements by Cleveland Wire Cloth and Manufacturing Co.

Cleloy screen sections are manufactured and woven to withstand high abrasion, corrosion and continuous process steam. Properly applied, they produce high tonnage, reduce blinding and require minimum maintenance.

For amazing results in your screen operations—write or call your specifications today.

See our ad in PIT & QUARRY Yearbook

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**NO SPOT FOR A BREAKDOWN!**

**KEEP IT GOING AT ITS BEST ...USE ONLY GENUINE HAYWARD REPAIR PARTS!**

Hayward Buckets are designed with the most efficient construction features known. And only with *genuine* Hayward replacement parts can you be sure of maintaining that same high quality. Cheaper "bootleg" parts reduce efficiency, raise operating costs and disrupt schedules.

**Anticipate any possible breakdown.**
**Write today for list of genuine Hayward parts.**

**THE HAYWARD COMPANY**
**50 CHURCH STREET, DEP'T R, NEW YORK 7, N. Y.**
***Builders of Better Buckets Since 1888***

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*(Continued from page 68)*

his position in relation to the over-all operation, not merely a cog in a machine." Mr. Curtis notes that 31 men have been with the firm for 25 years or more, and one, John Wesley Taylor, "has been digging sand for 62 years." Harold A. Koop's safety program, an important way of showing the firm's concern for its men, has resulted in the firm winning three national safety awards since 1951.

*Production.* Lyman-Richey has produced more than 68 million tons of sand and gravel since records were first kept in 1892. A roadbase 24 ft. wide and 9 in. thick using all this material would stretch half way around the world, Mr. Curtis notes. An interesting sidelight of this impressive production is the fact that the firm has sold more than 1,000 acres of worked-out land to lake-short Nebraska for state parks, and more than 1,300 acres to other agencies. These areas constitute "a major contribution to the field of recreation in Nebraska," Mr. Curtis notes with justifiable pride.

## Arkansas Cement boosts state industrialization

THROUGH ITS SUBSIDIARY Arkansas Cement Co., Arkansas-Louisiana Gas Co. is offering free cement to municipal agencies in Arkansas which plan to construct industrial plants to house industry. Local agencies throughout the South are enticing industry to move there with free land or buildings. The big Arkansas utility is giving the movement a further push with this new twist.

Ark-La apparently will use the cement gifts to largely replace its cash giving of former years. One company official said the cement might cost the firm 20 percent more than has its cash gifts. Ark-La absorbs the cost of the cement, but not shipping charges to the construction site. The firm has no ulterior motives, a spokesman noted, since the cement is free to all qualified municipal groups in the state, including many in towns without Ark-La service. However, the gifts might create more interest in concrete construction, and so benefit the cement subsidiary.

In a related move, the year-old Arkansas Steel and Prestressed Concrete Corp., near Little Rock, agreed to sell its structural members at 21 percent less than usual to the civic agencies.

*(Continued on page 72)*

*See the black concentrates from the beach sand. The Jeffrey jig recovers these.*

# Jeffrey jig concentrates valuable materials

A beach sand operation yields 3% ilmenite... a black iron titanate, which lends valuable characteristics to abrasives, cement, electrodes, lamp filaments and other critical products. A slag yields profitable amounts of chrome for remelting by a producer of ferro chrome. Gravel is jigged to 0.6% shale or lower... well below the 1% limit required by State specifications.

The Jeffrey jig is so flexible, so efficient that it can be adjusted to all these exacting separations... handles them as easily and surely as it does routine separations. Down-stroke separation is a distinctive feature that makes the air-operated Jeffrey jig effective over a great size range. Capacity per unit of area is exceptionally high... much higher than that of any competitive jig.

*Is YOUR product bringing the top dollar?* Can you meet the most rigid specifications? Do you get the most *PROFITABLE* yield from raw materials?

For detailed information, get in touch with The Jeffrey Manufacturing Company, 935 North Fourth Street, Columbus 16, Ohio.

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PLUS ECONOMY
REPLACE WITH
INDIAN BRAND

Get the most out of your present equipment. When you need replacements, remember we started in 1913 to build our reputation in the Manganese Steel field for dependability plus economy.

Insist on
INDIAN BRAND
MANGANESE STEEL

Shovel Dippers • Dipper Teeth
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Mantles • Concaves
Bowl Liners • Roll Shells
Pulverizer Hammers
Grate Bars • Breaker Plates
Ball Mill Liners • Screen Plates
Misc. Manganese Steel Castings

THE FROG, SWITCH AND
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Carlisle, Pennsylvania • Established 1881

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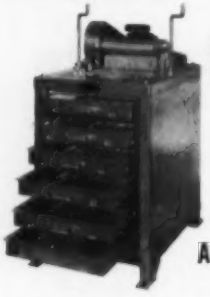
GILSON
TESTING
SCREEN



SIZE TESTS
CRUSHED
STONE,
GRAVEL,
SAND,
ALL ROAD
AGGREGATES

Makes 2 to 7 separations simultaneously in five minutes or less. Size range: 4-in. to 200-mesh. Sand attachment optional for handling 8-in. sieves.

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## INDUSTRY NEWS

(Continued from page 70)

### Ideal stockholders approve acquisition

ACQUISITION OF VOLUNTEER PORTLAND Cement Co., Knoxville, Tenn., by Ideal Cement Co. was approved by Ideal stockholders July 28. Roughly 80 percent of the outstanding stock voted in favor of the move.

Two Volunteer directors, Charles F. Lewis of Knoxville, and J. Ross Hanahan, Jr., of Charleston, S.C., have been elected to Ideal's board, subject to the plan becoming effective.

# CALENDAR

## OF COMING EVENTS

### 1959

**October 1-3, 1959**
National Lime Association, Operators Meeting, Sheraton Hotel, Phila., Pa.

**October 8-10, 1959**
Exploratory Drilling Symposium, Pennsylvania State University, University Park (College Park), Pennsylvania

**October 11-16, 1959**
American Society for Testing Materials, Third Pacific Area National Meeting, Sheraton Palace Hotel, San Francisco, Calif.

**October 19-23, 1959**
National Safety Council, annual Safety Congress and Exposition, industrial safety sessions at Conrad Hilton Hotel, Chicago

**October 29-30, 1959**
National Slag Association, Annual Meeting, Boca Raton Hotel, Boca Raton, Florida

### 1960

**January 18-21, 1960**
American Road Builders Association, Annual Convention, Netherland Hilton Hotel, Cincinnati, Ohio

**January 19-21, 1960**
National Limestone Institute, 15th annual meeting, Statler-Hilton Hotel, Washington, D.C.

**January 24-28, 1960**
Associated Equipment Distributors, Annual Meeting, Conrad Hilton Hotel, Chicago

**January 28-29, 1960**
Expanded Clay & Shale Association, Annual Meeting, Hotel Roanoke, Va.

**February 1-5, 1960**
American Society for Testing Materials, Committee Week, Hotel Sherman, Chicago

**February 15-19, 1960**
National Sand & Gravel Association, Convention & Exposition, Conrad Hilton Hotel & Coliseum, Chicago

**February 22-24, 1960**
National Crushed Stone Association, Annual Convention & Exposition, Conrad Hilton Hotel, Chicago

**June 26—July 1, 1960**
ASTM annual meeting and apparatus exhibit, Chalfonte-Haddon Hall, Atlantic City, New Jersey



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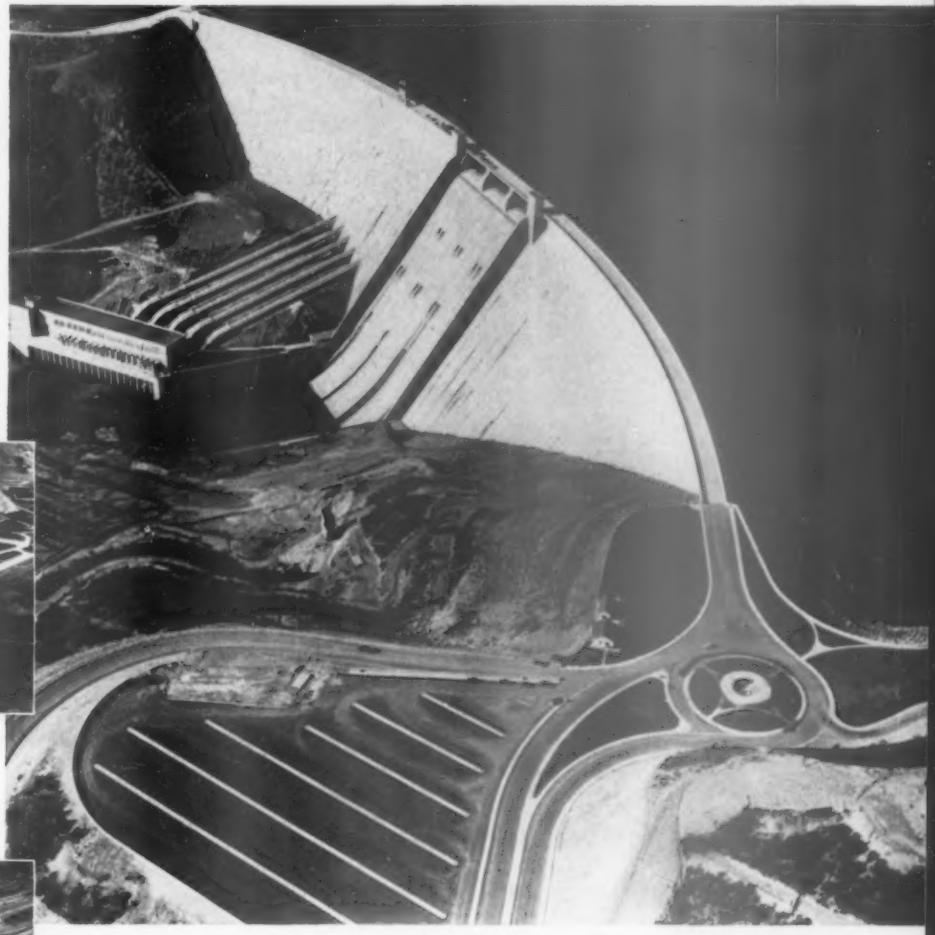
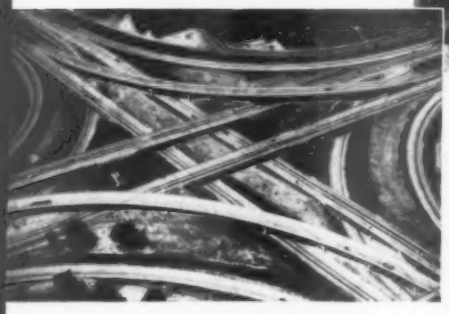


Right: This dramatic view of Shasta Dam in California demonstrates the progress made by construction engineers in conserving water supply, preventing flood destruction and providing water needed to make arid land useful again.

Above: To meet the challenge of the jet age, engineers and contractors are being called upon to build and expand airport runways to handle increased traffic. (View shows Lambert Field, St. Louis.)



Above: This view of one of the interchanges on the high speed Detroit expressway is a striking example of the contribution the construction industry is making to the tremendous highway program.

In aggregate and sand production . . . *as in all of the great ore and industrial mineral operations the world over* . . . there has been no record to equal the performance of Symons Cone Crushers that have so consistently and efficiently produced great quantities of finely crushed product at low cost.

Whether you are a contractor, operator, construction engineer, designer or manufacturer, it will pay you to specify and use Symons Cone Crushers for primary, secondary, or finer reductions, in capacities to over 900 tons per hour. Write for literature.

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# 7 TONS PER PASS . . . . . .

## big PAYLOADER® steps up output on loading and stockpiling

This new Model H-120 "PAYLOADER" tractor-shovel is setting production records in pits, plants and quarries throughout the country. Owners report handling up to 7 tons per pass. This big capacity, coupled with exceptionally fast cycle speeds, steps up plant output tremendously, cuts truck loading time and costs, and greatly improves plant efficiency.

### Loads More Trucks Per Hour

Reducing the waiting and loading time of trucks, both your own and those of customers, not only improves service but also makes it possible to handle a greater volume. Extra-high lift (14'7½" under hinge pin, 10'10" dumped clearance) and longer reach (3'6" from tires) load biggest trucks with ease and safety.

### More Output Per Dollar

In many instances, a single H-120 has replaced several smaller tractor-shovels or clamshell cranes, with greater output, lower equipment investment and less labor cost.

### Mobility and Flexibility

Travel speeds up to 26 mph make the big capacity of this unit available anywhere in the area in a matter of seconds. It can load from various stockpiles or move rapidly to other areas to build new stockpiles . . . to clean-up, strip, excavate or load in the pit.

### Greater Safety

The operator is seated high enough to permit him to see the bucket at all times and with full visibility in all directions. Boom arms and moving parts are located well forward and removed from any contact with the operator. Safety ladder and safety-glass front and rear windshields are additional operator protective features.

# . . . LOADS TRUCKS FASTER

### Riding and Operating Ease

A long wheelbase, wide tread, big 26.5 x 25 tires, good stability and low center of gravity, together with adjustable bucket-type seat give the operator a comfortable ride. Full power control — power-shift transmission, power-steer and 4-wheel *air-brakes* — makes this "PAYLOADER" easier to operate than many smaller tractor-shovels. Controls are easy to reach and simple to operate.

### Advanced Design

More than a ton of "dead-weight" on the working end of the H-120 is saved by fabricating the boom arms of expensive "T-1" steel which has a yield strength three times that of structural steel. Approved use of dry ballast in the rear tires further eliminates "dead-weight" while providing better stability and a lower center of gravity.

### More Power

A heavy-duty, turbo-charged, 300-horsepower diesel engine delivers abundant power for handling both tractive and hydraulic functions simultaneously without "lugging down".

For additional information on the new H-120 "PAYLOADER" use the attached coupon or contact your HOUGH distributor.

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# HINTS & HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

## Quarry safety

AN ENGLISH QUARRY OWNER devised a simple but sturdy shield to protect the drillers at the bottom of the face from falling rock. Four well-braced 12-in. I-beams support a steel plate roof, just high enough to let the men work beneath it comfortably. The whole assembly is shifted from one place to another along the face with the shovel grabbing a wire rope sling on the frame.

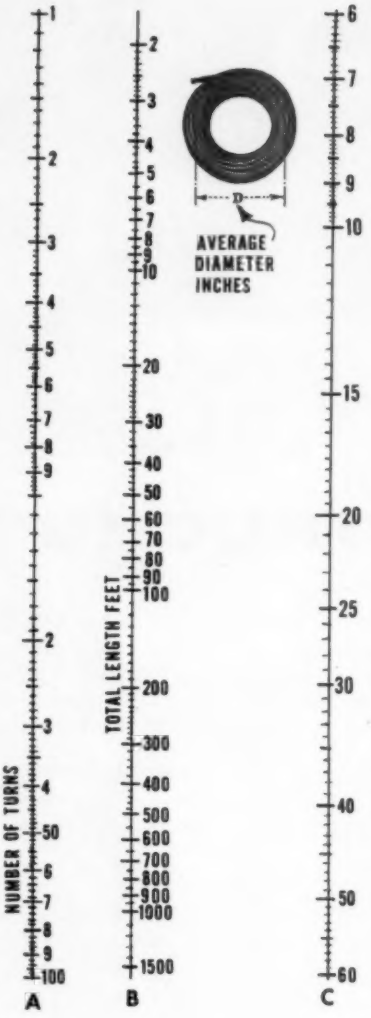
One major refinement proved to be necessary after the assembly had been in operation. Since the rectangular steel structure could not be fitted snugly against the uneven rock wall, it left an opening to admit falling rock. This hazard was overcome by using a number of hinged plates at the top of the leading edge. The plates are long enough to lean against the face and sturdy enough to deflect falling rock. When they get battered enough not to flex smoothly, they can be replaced.

## How long is a coil?

HOW MANY TIMES have you wished to know how much rope, hose or wire you had in a big coil? How many times did you guess, only to find that you misjudged by a country mile? Here's an exceedingly handy chart for estimating the length of anything coiled or rolled. Once you get the hang of it, you'll be able to make close estimates without going to the trouble of unwinding the coil and measuring the length with a tape.

Simply count the number of turns in the coil or roll. Then measure the "average" diameter as shown on the sketch. Use a straightedge to connect these values, as shown with the dotted line on the chart and read the answer in column B.

As an example: How many feet of hose are there in a coil whose average diameter is 20 in. and which has 10 turns. By connecting the number 10 in column A with the number 20 in column C, the line intersects column B at 53, the approximate length of the hose in the coil.




The chart can be worked "backwards" too. If you want to take 300 ft. of wire rope with you on a job, merely put your ruler on 300 in column B. The readings in column A and C will tell you the average diameter and the number of turns to make.

W. F. Schaphorst, Newark, N. J.

## Avoid face powder

WHEN A PAPER BAG BURSTS in a bagging machine it doesn't usually cause a lost time accident. But just the same, it is an inconvenient, uncomfortable incident for the machine operator whether he is working with cement, lime or plaster. A western cement producer rigged up an auto windshield with safety glass above the loading spouts of the packers just to protect the bagger from the infrequent mishap. Since the glass is hinged, it can be swung out of the way.

## Conveyor supports

THERE'S BEEN LOTS of discussion about how to support the discharge end of long belt conveyors reaching out over deep storage piles and quite a few ingenious ideas for designing the supports. The objective, of course, is to evade or minimize the internal stresses which build up as free-flowing material is put into or taken out of storage.

Many designers prefer to simply pour enough solid concrete to dam or contain the fluid forces. But a western rock products producer sidestepped the problem, saving design expense and construction material at the same time.

The half-dozen conveyors which make storage piles are all supported on a single long beam running the full length of the storage area. The beam is supported at each end by simple A-frames. Intermediate supports are spaced to touch ground between the piles where there is usually very little material.

The beam itself is not very heavy, for only the head end of the conveyors bears on it. Nor are the A-frames particularly rugged; there is practically no strain on them from piled materials. This setup permits conveyors to be added or removed without difficulty, and the A-frames can be shifted to keep them clear of the piles.

(Continued on page 78)

# "MAGNECON" KILN LINERS EXCEL IN THE WORLD OF CEMENT MANUFACTURE

"MAGNECON" has gained international recognition as the leading hot zone refractory for rotary kilns. "MAGNECON" brick is a strong, dense basic refractory with high spalling resistance, low thermal conductivity and excellent resistance to chemical and abrasive attack. It is outstanding in its ability to acquire and hold a protective coating. It is made from Canadian magnesite with chrome ore under exacting chemical and physical controls.

"MAGNECON" BRICKS are now available with steel plates and cardboard spacers. Plates are keyed to the brick to prevent slippage.

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CANADA CEMENT BUILDING, MONTREAL, CANADA

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(Continued from page 76)

## Liquid cyclone position

IT IS NOT ALWAYS NECESSARY, or possible, to install liquid cyclones ramrod upright like soldiers on sentry duty. Several phosphate producers have found that the big units they use seem to work more efficiently when tilted from the vertical, and they have experimented to determine the angle which gives the best results. An eastern producer claims superior efficiency with liquid cyclones placed horizontally, and this is the most extreme position we have seen or heard about.

## Safety hint

IN SPITE OF ELABORATE safety precautions in the rock products industries, there are still a number of avoidable accidents. Even with a low accident rate, men are still getting hurt or killed from causes which seem to offend common sense.

Within the space of a couple of weeks we heard about a foreman in an English sand pit who was trapped by the collapse of a pit face and the owner of a Minnesota firm who was suffocated in a crusher hopper. Another man was killed when the face of a quarry collapsed as he was walking close to the edge.

There seem to be no laws against working alone in hazardous locations. But there are a number of precautions which can be taken when working around quarry faces or hoppers. Quite a few producers require their workers to wear safety belts attached to winches when working in deep hoppers or bins and to wear masks or inhalators. Barmen in most quarries wouldn't think of working on the face without substantial rigging to hold them.

The only preventive for an unstable face in a sand pit is to avoid a vertical face as much as possible. Unstable quarry walls should be brought down to avoid risk to the drillers above as well as to protect the machinery working close to the face below.

## Fertilizer mixer

MUCH OF THE CONVENIENCE and safety gained with the use of fertilizer-type explosives is dissipated with labor expense and wasted material. But manufacturers and producers have worked out two ways of overcoming these twin headaches, packaged ammonium nitrate and bulk loading machines.

A midwestern rock products producer chose to build his own loading machine and to continue to purchase his prilled nitrates in conventional paper bags. In this way, he gets the advantages of bulk purchase and of controlling the oil-nitrate mixture as it goes into the blast hole.

The hopper and chute are fabricated of aluminum, lightweight, non-sparking and readily assembled on the tailgate of a truck. As nitrate flows down the spout, it actuates a switch to start the oil sprays—six small nozzles in the pipe. The sprays coat the particles of ammonium nitrate with a uniform amount of oil as it flows down the spout and into the blast hole. There is no loss of oil and no nitrate outside the hole.

## Double-deck conveyors

ONE OF THE MAJOR difficulties of concrete tunnels under reclaim piles is their permanence. If the tunnel was originally made too narrow or too shallow in a misguided effort to save money, there's very little to be done later to improve operating conditions.

When a southern producer's business expanded enough to justify more expansion, he, too, found that his reclaim tunnel was a bottleneck. Fortunately, he had plenty of headroom in a narrow tunnel, enough at least to put in a second belt conveyor right above the old one.

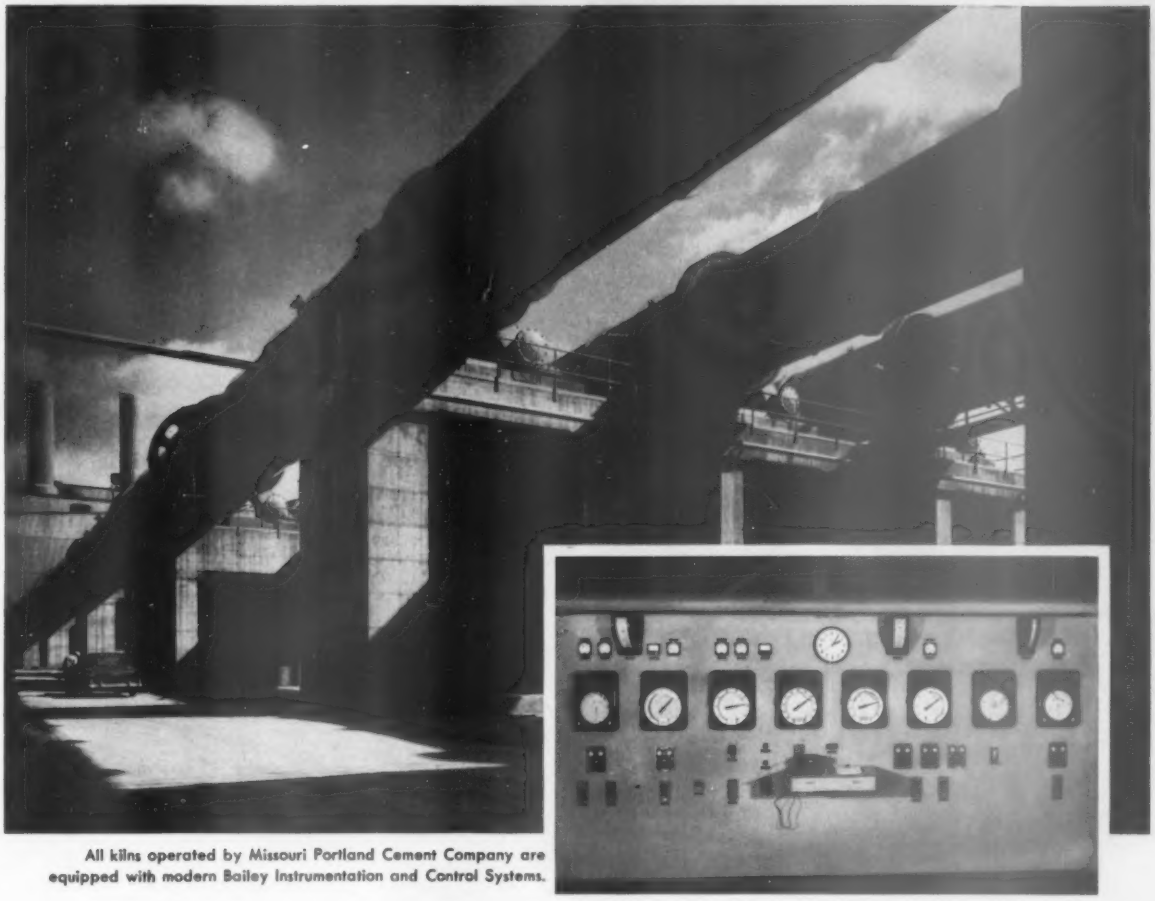
The framework for the new conveyor is supported from the channel frame of the old one using angles bent to form knees. These bends let the lower belt clear the supports. At the same time, the upper part of the bend holds a corrugated strip to shield the lower belt from falling material.

## Handle with care: ammonium nitrate

TO A SAFETY-MINDED midwestern producer, all explosives are a potential hazard. He permits no letdown in alertness when handling either dynamite or fertilizer. Even prilled ammonium nitrate is given the same respect as the high explosives.

The prills are brought into the plant area in wooden box cars, each equipped with lightning arrestors. These cars are used as temporary storage houses for the explosives which are distributed to the quarry area in a covered truck. When the cars are empty, they are very carefully cleaned to remove the last bit of the hygroscopic salt. Naturally, if there is any appreciable amount of unused ammonium nitrate, the car and contents is removed from the quarry area before blasting.

END



All kilns operated by Missouri Portland Cement Company are equipped with modern Bailey Instrumentation and Control Systems.

# How to control the digestion of giant kilns

These giant kilns have delicate stomachs. But the Missouri Portland Cement Company knows how to coddle them to get maximum capacity, uniform product and low fuel rate.

They do it with a Bailey Control System with a central Control Panel where a single attendant has complete control of the variables of combustion and heating.

Because the system keeps continuous chart records, the Burner can check the reading and trend of Kiln Speed, Exit Gas Temperature, % Oxygen in Exit Gas, % Combustibles in Exit Gas, Kiln Shell Temperature, Hood Draft, Temperature of Secondary Air Leaving Cooler, Temperature of Coal-Air Mixture from Coal Mill, Fuel Gas Flow, Feed End Draft, Kiln Speed, Cooler Speed, Cooler Fan Discharge Pressure, Cooler Undergrate Pressure, Cooler Air Flow, Coal Mill Primary Air Pressure, Coal Mill Exhauster Fan Suction, and Fuel Gas Flow.

The system works so dependably that week-long kiln runs have been made without the operator touching anything.

Let a Bailey Engineer help you plan for peak performance! For additional information write for a Bailey Kiln Control Folder. C-14

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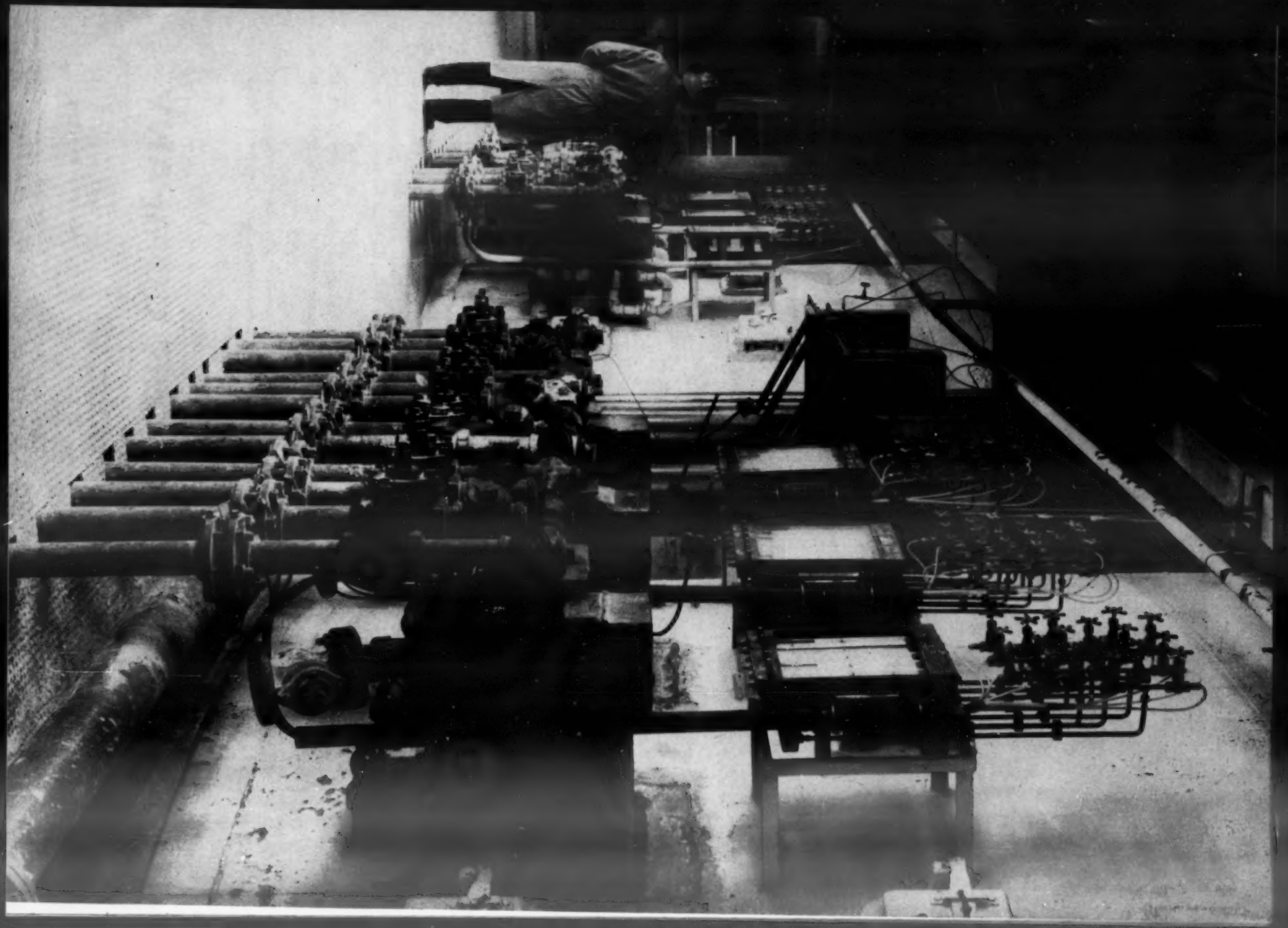


ROCK PRODUCTS
October 1959

*Vertical lime kilns set production records with innovations to burning system and materials handling equipment*

# Ingenuity and research pay off

by Elwood Meschter

THREE BIG VERTICAL LIME KILNS at Ashtabula, Ohio, have had their capacity stepped up from 100 to more than 450 tons of lime a day each. This spectacular increase in productivity was achieved by Union Carbide engineers, the result of an intensive research program into calcium carbide production.

Other tangible results of the 10-year program include a drastic reduction in the amount of unburned core, from a maximum of 10 to 12 percent at the low rate to an average of 3 to 3½ percent at 450 tpd. This advance in lime quality is reflected in lower energy requirements in the electric furnaces, energy which is not consumed to complete the calcination of underburned stone. The heat requirement for making finished lime remains the same, about 5 million Btu. per ton. However, the size of the raw limestone feed has been increased from 3½ x 2 in. to the less costly 5½ x 3½-in. stone.

Basic changes to the 50-ft. high, 11 x 11-ft. cross-section kilns involve radical improvements to the burning system and ingenious design of the auxiliary mechanical equipment. With closer control of burning, it has been possible to put more of the actual operation of each kiln under instrument control. Consequently, fewer men are needed to operate the kilns, even at the highest production rates. The kilns and auxiliary machinery now are operated with a crew of only 31.

Improvements to the firing system and to the auxiliary equipment include these major features:

(1) A single huge induced-draft fan for each kiln to maintain negative pressure in the kilns.

(2) Firing equipment in the form of five water-cooled, box type, structural-steel beams placed in each kiln to achieve maximum thermal efficiency.

(3) Automatically controlled feeders and weigh hoppers under each kiln to maintain a high rate of discharge and uniform draw for the full section of the kiln.

(4) Regulation of the volume and Btu. content of carbon monoxide gas, a by-product of the electric furnaces.

The objective of the program was to bring lime production up to the needs of the voracious electric furnaces making carbide without requiring a great investment of new capital in lime-making equipment. The three kilns, originally selected for their ability to reduce air pollution in the heavily industrialized Ashtabula district, already had proved successful on that score. Now they have justified their selection in up-rated productive capacity, too.

The success of the high-capacity kilns has led to the adoption in almost every part of the installation of refinements that reduce costs or improve efficiency.

**Industrial television observes the operation** of equipment in a remote corner of the plant. Here, a camera monitors the discharge of an elevator bringing hot pebble lime to a screen and distributing conveyor. An operator can easily check conditions at a glance, sparing himself a long trip to the top of an elevator at frequent intervals.

*Please turn page*

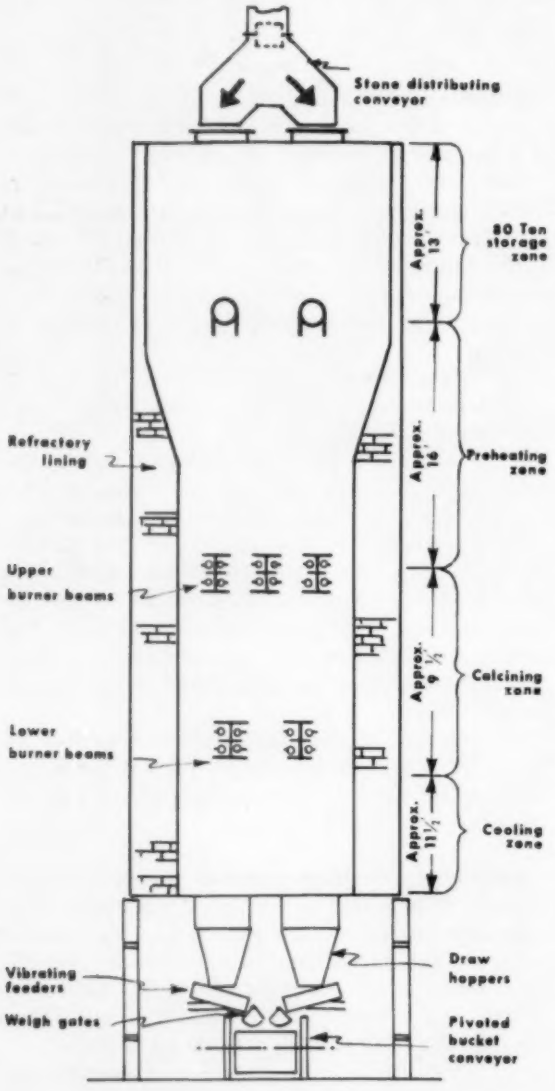
THREE BURNER BEAMS project from each side of the kilns to inject a carbon monoxide/natural gas mixture deep into the charge of limestone

## INGENUITY AND RESEARCH PAY OFF, *continued from p. 81*

Lime fines are reclaimed. Ordinarily lime fines cannot be used in an electric furnace because of their tendency to dampen the chemical reaction when packed between the voids of the pebble lime and carbon charge. But Union Carbide has overcome this obstacle by pelletizing the fines. A 75-ton per day continuous press makes pellets that are suitable for the electric furnaces.

Air locks for the tops of the kilns are under development. Since about 28-in. negative pressure is maintained in the kilns, the smooth operation of a kiln is disturbed every time it is opened for charging, about 4 or 5 times each shift. The operators hope eventually to be able to charge each kiln mechanically and continuously without breaking the high suction inside.

TYPICAL SECTION thru high-capacity lime kiln




**Continuous gas analyzers** in the exhaust-gas ducts determine the amount of carbon monoxide, carbon dioxide and oxygen. Before the end of 1959 this information will be used to balance and regulate automatically the variables of kiln operation that now are controlled individually—fuel Btu. and volume, draft-fan speed and material flow through the kiln.

**The draft fan system** itself was the result of many rearrangements and experiments. Originally, each kiln included a small fan which maintained about 6-in. w.g. negative pressure in the kiln. After several systems were tried, including recycling exhaust gas, Union Carbide's engineers settled for this one: A single hot gas fan pulling a maximum of 60,000 cfm. at 600 deg. F. maintains 28-in. suction in each kiln. The kiln exhaust gases go into a pair of wet scrubbers before discharge to the atmosphere with a smaller fan.

Practically all of the dust removed in the scrubbers is limestone dust. Most of the quicklime dust is caught near the top of the kiln by the charge of cold limestone and carried back into the kiln.

This meeting of cold stone and hot gas helps to moderate the temperature of the exhaust gas to about 600 deg., at the same time preheating the stone as it moves rapidly down to the firing zone.

Hooded exhaust ducts project into the body of the kiln. The hoods are necessary to prevent the heavy suction from pulling the 5½ x 3½-in. stone into the ductwork. This was even more of a hazard with the 3½ x 2-in. limestone previously used.

**The water-cooled burner beams** were the most spectacular innovation that came of Union Carbide's efforts to radically improve thermal efficiency. Now there are five boxed beams thrust through the waist of each kiln, three at one level where the calcining reaction starts, and two at another level 10 ft. lower. The reaction is controlled by regulating the distribution of fuel between the two sets of burner beams.

Water pipes and fuel pipes are brought into the beam from each end. The gas pipes supply jets placed at intervals along each side of the beam.

Each pipe can be readily uncoupled to permit the beam to be removed from the kiln.

The deep beams are strong enough to support the weight of stone above if it should hang on them. They also are strong enough to resist deformation if the cooling water supply is interrupted briefly, but an accumulation of lime on the top of the beams helps to insulate them from the effects of the 1,500 deg. F. heat.

The high rate of production is a great help in moving the material rapidly past the beams, which reduce the cross-section of the kilns. The two lower beams were particularly vulnerable to hanging, probably because of the tendency of the lime (which is close to its maximum temperature at the level of the lower beams) to fuse to the ridge of cooler material capping the beams.

Each side of the lower beams is equipped with a pneumatically operated ram or stoker bar that periodically breaks up any build-up on the beams. The pneumatic cylinders are mounted from an arc-shaped rail above the firing floor, while the steel rams project into the kiln through a ball joint in the shell. These "stokers" can probe the full cross-section of the kiln above the burner beams and effectively break up any hanging lime.

**Effective lime draw** from the entire cross-section of the kilns was a critical problem. The draw system now operates on a time cycle determined by the kiln operating rate, which is controlled by the volume of fuel gas used.

Six vibrating feeders under each kiln work with weigh gates to make up the draw system. A feeder started by the time system feeds hot lime into a weigh bucket until a specific weight—up to 40 lb. —has been discharged. When the exact weight, within ounces, has been reached, the feeder stops and the gate discharges its load to a pivoted bucket conveyor below. Operation of the feeders and gates is synchronized with the speed of the conveyor to make sure that each gate discharges to an empty bucket in the conveyor. This combination weight and volume control replaces a previous method of simple volume discharge from the kiln. While the first unit was an expensive innovation, it vastly improved lime quality and simplified kiln control. Now all three kilns have been equipped with this draw system.

**Control of fuel gas quality** is still an active project. Principal fuel for lime burning is carbon monoxide, waste product of the lime-carbon reaction in the electric arc carbide furnaces. This volatile, toxic, combustible gas is so hard to handle that some carbide makers prefer to waste it to the atmosphere. But the availability of such huge volumes of fuel with high calorific value challenged Union Carbide engineers to develop ways of handling it safely.

VIBRATING FEEDERS on a time cycle are controlled by weigh hoppers to draw a carefully measured amount of finished lime from the kilns

Monoxide from the furnaces is about 80 percent pure. It is mixed with enough natural gas at around 1,000 Btu. per cu. ft. to maintain a constant 250 Btu. per cu. ft. This is done with a recording calorimeter in each gas stream to measure its fuel value. Enough natural gas is admitted to the monoxide supply to bring its fuel value up to a constant, even with fluctuating calorific values.

Rigid safety precautions must be taken for handling this dangerous gas ahead of the kilns. It is flammable and explosive in low concentrations and pressures; it is highly toxic in concentrations of only a few parts per million in the air. The danger is past when it is in the kilns—the extreme suction there effectively prevents gas leakage once it reaches the burners. Complete vapor-tight enclosure of the mixing area contains any leakage at this point.

A small amount of ethyl mercaptan, which has a nauseous odor in minute concentrations, is added to the odorless carbon monoxide system. This pungent mixture can be sensed instantly to signal any leak in the piping system. Monoxide detectors are located around the mixing area; face masks and

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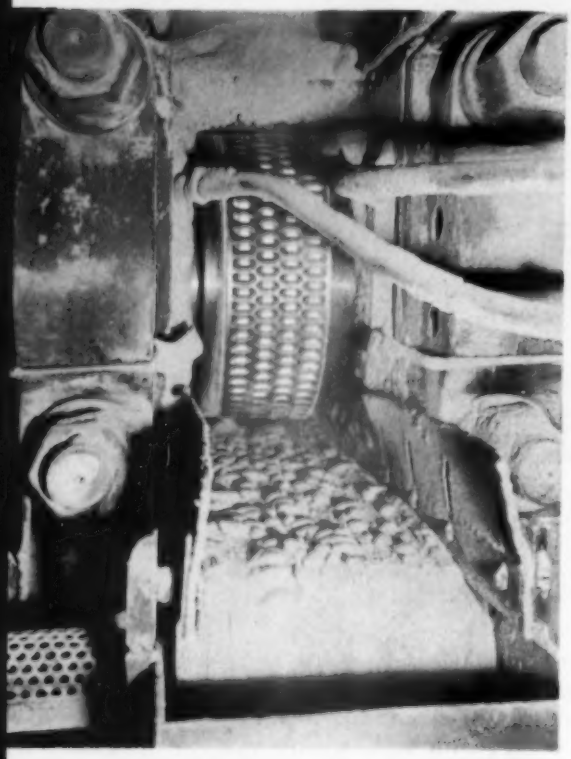

THE MAW of a 75-ton pelletizing press converts lime fines from a waste product into useable pellets

oxygen inhalators are available for emergencies.

The firing system has pressure relief valves that vent the fuel lines to the atmosphere if gas pressure builds up suddenly or if the kilns are shut down. These valves can be actuated from the firing floor at the level of each set of burner beams.

Radical increases in kiln production brought materials handling problems. Raw materials and finished lime had to be processed, stored and reclaimed at much faster rates to keep up with the high capacity of the kilns. Materials handling equipment was of conventional design, but refinements were added by Union Carbide engineers.

High-calcium limestone is brought to Ashtabula by lake boat from deposits in northern Michigan and stockpiled at the wharf. It is brought to the carbide plant several miles away by rail, dumped and taken to one of six 350-ton storage bins on a 250-tph. belt conveyor system. Only sized limestone is put into storage; minus ¾-in. fines are screened out with a 5 x 12-ft. vibrating screen and sold locally.

Heaters help to maintain the high rate of material flow out of bins during the winter when moisture or freezing would retard it. The conical bin bottoms are fitted with ducts to inject hot air. Limestone, taken out of the bins with a vibrating feeder, is put on a belt conveyor for the trip to the top of the kilns. Here a traveling tripper is spotted above a kiln-loading chute to discharge the stone.

Each kiln is charged with stone four or five times each shift, keeping about 80 tons of material above the gas takeoff ducts. The use of 5½ x 3½-in. limestone yields better draft and burning conditions deep in the kiln than when the 3½ x 2-in. stone was used.

Hot pebble lime is handled in a pivoted bucket conveyor-elevator. Even with synchronized discharge mechanisms, the hot lime in the buckets does not quickly lose its heat. But dust hoods at the discharge point under the kiln draw off a great deal of heat, along with most of the lime dust.

Two 200-ton storage bins hold the lime. One is for kiln-run material, the other holds crushed and screened lime for truck shipment. The kiln-run bin discharges to the pivoted bucket line to be recycled to the crusher.

Crushed lime is sent to the carbide furnace storage area on a series of belt conveyors and pivoted bucket conveyors and put into storage bins after screening. There are ten steel storage bins, each holding about 80 tons of lime for use in the electric arc furnaces or for shipment to customers. In addition, three concrete silos each hold about 200 tons for the same purposes.

**The fines are not wasted.** All minus ¼-in. material is sent to a surge bin ahead of a pelletizing press. Fines are fed into the nip of a pair of heavy rolls with almond-shaped pockets. Lime in these pockets is squeezed together with a pressure of about 75 tons, forming the powder into a pellet about 1½ x ½ in. These pellets are hard enough to hold their shape in the conveying system ahead of the furnaces and to make a suitable burden in the electric furnaces.

The operating features that make the Ashtabula kilns so successful certainly could be applied to the design and construction of smaller vertical kilns ranging from 350 down to 150 tons a day. The operating know-how which Union Carbide's engineers have acquired over a period of years will be available to other lime producers on a royalty basis. This arrangement can eliminate much of the trial-and-error procedure and high development expense incurred with the kilns at Ashtabula. END

Part 1

*Here are some of the general conclusions that can be drawn at this time*

# Where do we stand on depreciation and percentage depletion?

by Joseph N. Bell

TWO MATTERS OF LIFE AND DEATH to the rock industries are today being pontificated in the cloistered halls of the U. S. Treasury Department and the Ways and Means Committee of the House of Representatives. This double-barreled dose of business dynamite consists of depreciation and percentage depletion. They were named—along with labor—as the three most potent problems facing the rock industries today in the recent ROCK PRODUCTS survey of producers. This feeling is shared by Washington officials, as well. David Lindsay, assistant to the Secretary of the Treasury, prefaced his remarks on percentage depletion (re: Treasury's bill to change the definition of "mining") before the House Ways and Means Committee recently by saying:

"In our view, this legislative recommendation is one of the most important pieces of tax legislation which will be considered by the Congress this year."

In view of the importance attached to this area by all the groups most closely involved, where—as of now—do we stand on percentage depletion and depreciation? To seek out the answer to this question, ROCK PRODUCTS sent me to the nation's capital. I talked with representatives of all three groups involved: the producers, the Treasury Department and the legislators. Here are some of the general conclusions that can be drawn at this time:

1. The attitude of the Internal Revenue Service is hardening in both areas. The recent court decisions that have gone against Treasury in these matters have redoubled Treasury's determination to seek and obtain Congressional approval—through new laws—for the stand on which they have been judicially defeated time and again. Treasury, however, is attempting to ameliorate this stand with soft words, belie the strong feeling in the IRS that the screws must be tightened on both depreciation and percentage depletion.

2. Members of the Ways and Means Committee are divided on these matters, but probably lean slightly toward the industry viewpoint.

3. The controversial Bulletin F—on which so many IRS agents made highly questionable depreciation decisions—is probably dead, to be mourned by neither industry nor the Treasury Department.

Now—within the framework of these broad generalities—let's examine in more detail the situation with regard to both depreciation and percentage depletion.

**The Treasury Department's current attitude** toward depreciation was summarized recently by Undersecretary Fred C. Scribner, Jr. He said, in part:

"Section 167 of the 1954 Code provides that there shall be allowed as depreciation deduction a reasonable allowance for the exhaustion, wear and tear (including a reasonable allowance for obsolescence) of (1) property used in the trade or business or (2) property held for the production of income. This is not a new section. It has appeared since 1918. Questions arise, of course, as to what is 'reasonable' and how best to determine

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## WHERE DO WE STAND ON DEPRECIATION/DEPLETION? *continued from p. 85*

**Experts in the field of tax depreciation problems suggest:**

- *Familiarize yourself with current depreciation laws and regulations*
- *Set up your depreciation items—both length of life and salvage value—as realistically as you possibly can*
- *Look into the possible advantages of having a letter of agreement with the government on the depreciation table you select*
- *Don't hesitate to argue with the arbitrary ruling of an IRS agent*
- *If the agent is inflexible and you feel your cause is just, go over his head*

the amount properly to be allowed for obsolescence.

"The general rule enforced by the service, and it has been the rule for many years, is to allow depreciation based on the actual period of time that the item of machinery in question is used in trade or business by the taxpayer. In order to provide some guidance as to the normal usable life of a particular piece of property, the Treasury Department issued Bulletin F in January, 1942.

"This was intended only as a guide; it was not the intent that the lives set forth in Bulletin F represent the minimum life in every case. Actual usage by the property owner is the controlling determination. Some revenue agents have taken Bulletin F as the last word; this attitude IRS has attempted and is continuing to attempt to correct.

"Many false hopes have been raised about what a revised Bulletin F might contain. It would be erroneous to assume that a restudy of average lives would produce many reductions apart from the obsolescence factor. There is considerable thought that the reissuance of the bulletin in revised form might cause even more prolonged disputes than at present as to whether the normal life set forth in the bulletin or the prospective life measured by actual usage on the part of the taxpayer, or some other form of measurement should control the depreciation period in any particular situation.

"We do not believe that we would advance the resolution of the problems which do exist in the field of depreciation by reissuing Bulletin F if such reissuance resulted in agents or taxpayers assuming that the lives given in it, since the bulletin has been under intensive restudy, are now to be controlling and are to override the actual experience of an individual taxpayer. No issuance date has been agreed on for a revised Bulletin F, and the possibility exists that the present bulletin may not be revised and reissued."

This prediction was stated even more bluntly to me by another Treasury official, who said: "Bulletin F will probably never be released in revised form because of the tendency of IRS agents to use it as a Bible—which it is not."

After disposing of Bulletin F, however, Mr. Scribner added a warning to mitigate any elation which might be felt by industrial taxpayers over the demise of Bulletin F. Said Mr. Scribner:

"In attempting to estimate the average life of a piece of equipment, it is possible for experts in the field to come up with a reasonable estimate, although this is not at all an easy thing. Thereafter, some estimate might be made of how much obsolescence could be expected in this period, and some range of tolerance could perhaps be allowed to account for this uncertainty created by prospective obsolesence. However, in the technological field, we are moving so rapidly and developments are coming with such frequency that these estimates might be, at best, educated guesses.

"There are many taxpayers who would like to have a depreciation policy which would allow them not only to recover the full cost of a machine, but also to recover a sufficient amount to pay the full cost of a new, modern replacement. This approach to the depreciation problem might get us into very shaky and untenable ground. We would leave the

certain and demonstrable base of original cost, and might move into the area of hypothetical and questionable appraisals of replacement cost. This approach does not seem to have the elements of a realizable program."

In other words, you can probably look forward to getting rid of Bulletin F, but don't expect a softening anywhere along the line. Taxpayers, it would appear, will have to continue to call their depreciation shots as they see fit and hope to win the subsequent argument with the IRS. To this end, it would be profitable to repeat five suggestions, offered for ROCK PRODUCTS readers by experts in the field of tax depreciation problems:

1. Familiarize yourself with current depreciation laws and regulations. Particularly, you should have a copy of "Regulations Relating to Depreciation, United States Treasury Department, Internal Revenue Service Publication No. 311." You can obtain one for 20 cents by writing the U. S. Government Printing Office, Washington 25, D.C.

2. Set up your depreciation items—both length of life and salvage value—as realistically as possible. It's important that you select the proper depreciation method for your particular business. To do that, you should probably have professional help from a good tax accountant or attorney who has your interests at heart.

3. Look into the possible advantages of having a letter of agreement with the government on the depreciation table you select. You can request a review of your depreciation tables by an IRS agent; if he finds them satisfactory, he will draw up an agreement under which no deficiency payments can be assessed by the government, until the agreement is revoked by either party. Any revocation would be prospective only. This is, however, a calculated risk in asking for a written agreement. Although it protects the taxpayer, it can also result in the agent insisting on changing a depreciation table that might have avoided his scrutiny had you not called him into the picture. Consideration of such an agreement should be discussed with your attorney or tax accountant.

4. Don't hesitate to argue with the arbitrary ruling of an IRS agent. If you've made every effort to be fair, honest and equitable in setting up your depreciation tables, you don't have to knuckle under to the first thrust of an IRS agent. Individual agents vary widely in intelligence, ability, amenability and judgment. It would be foolish to antagonize them, since they are only doing their job as they see it. But you have a point of view, too, and if it conflicts with the IRS agent's, you have the right to try and make your reasoning prevail.

5. If the agent is inflexible and you feel your cause is just, go over his head. If at all possible, you should try to settle your differences with the agent. Any other course is expensive and time consuming. But you always have the right to go over the agent's head in pleading your case.

SUMMING UP: Depreciation will continue to be a thorny area for the rock products producer. The bugaboo of Bulletin F has probably been removed permanently, but not the determination of Treasury officials to look on most depreciation tables as an effort to do them out of something to which they have a constitutional right. Consequently, you should have competent tax advice in setting up your depreciation, be scrupulously honest about it, then stand your ground. There seems little likelihood that—beyond the probable demise of Bulletin F—there will be any changes either in law or in attitude in the area of depreciation in the immediate future.

**Percentage depletion is something else again.** This is an area of great volatility, where all sorts of changes are being sought, mainly by Treasury officials who feel the courts have cut off both IRS's nose and its revenue, as well.

Early this year, Treasury put before the House Ways and Means Committee a draft of a new percentage depletion law. It is a highly controversial document which, Treasury felt, would plug the legal loopholes presently depriving them of revenue to which they feel they are entitled. In March, the Ways and Means Committee held extensive hearings on this proposed legislation.

In June, I discussed percentage depletion with a number of Congressional and Treasury officials. I also studied the testimony taken by Ways and Means in its hearings. From all this material, three completely divergent points of view emerge—those of industry (and they vary rather broadly among different basic industries and even within the industries), the Treasury Department and the national legislators. Although there is no unanimity within each group, there is a majority view-

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## WHERE DO WE STAND ON DEPRECIATION/DEPLETION? *continued from p. 87*

point that has been rather clearly stated. In this and a succeeding article, ROCK PRODUCTS will try to summarize these three points of view and offer a few educated guesses on what rock producers can expect to happen with percentage depletion in the immediate future.

The viewpoints of all the rock industries were intelligently and effectively presented before the Committee by industry representatives. Most of the arguments were covered in the sand and gravel, crushed stone and portland cement testimony. Here are the salient points of this testimony.

**Sand and Gravel**—The Committee on Taxation of the National Sand and Gravel Association wants three revisions in Treasury's proposals:

1. Elimination of the new definition of mining and retention of the test of "commercially marketable mineral products" which now (says the Sand and Gravel Association) "has a well-established meaning."

2. Elimination of the necessity of distinguishing between "fine pulverization" and "grinding." In the Treasury draft, the former is not considered an allowable mining process, while the latter is. The Sand and Gravel Committee wants all pulverization to be specified as an allowable ordinary treatment process.

3. Elimination of the section that establishes an arbitrary and oftentimes unfair cutoff point by saying that a process specifically considered admissable as a mining operation will be disallowed if any nonallowable processes intervene.

**Crushed Stone.** The National Crushed Stone Association put its objections to the proposed Treasury bill in one all-inclusive suggestion:

"Recognizing that ours is but a one-process industry inevitably forces the conclusion that since we are entitled to percentage depletion as being plainly engaged in mining a natural resource, we should be allowed depletion on our entire—single—mining process of size reduction of the rock. We should not be required to make unrealistic and impossible distinctions between kinds or types of size-reduction processes such as between crushing, grinding, pulverization and fine pulverization, as the Treasury bill requires.

"We therefore suggest an amendment to the Treasury bill—modeled upon the Treasury's own proposal for coal whose processes parallel ours—which would make this principle unchallengeable by anyone . . . The simple and entirely justifiable solution is to make the proposed statute clear that all of our treatment processes are depletable."

**Portland Cement.** Boyce F. Martin, president of the Louisville Cement Co., presented the arguments of a group representing about 70 percent of the capacity of the cement industry in the United States. His plea was essentially this:

Retain the commercially marketable mineral products rule that has been part of the percentage depletion section of the internal revenue laws since 1932. This test is simple to understand and easy to administer. It will present no problems if the Treasury will accept its plain meaning. There is no justification for replacing it with a formula based on a differentiation between mining and manufacturing which will inevitably lead to controversies and discrimination.

Not all of the cement companies share this feeling. A dissenting opinion was voiced to the Ways and Means Committee by Ideal Cement Co. which—along with several other companies—would like to see the "marketability" test eliminated. They urged, however, that the new definition of mining include "in the case of calcium carbonates, shale and other minerals used in making cement—all processes used in the production of kiln feed."

In general, most rock industry representatives feel that Treasury has tried to force in the courts an interpretation of percentage depletion that was not intended by Congress in passing the Code.

"They're trying desperately to get a conflicting opinion in a cement company case to give some stature to their claims," one industry representative told me, "but they haven't gotten to first base. So now they're trying to get their viewpoint legislated. The legislative history and terms of this present statute have been presented to many courts, and always the IRS has been beaten. They insist they know what the intent of Congress was, but the courts have refused to interpret the Code that way."

Treasury's draft of new percentage-depletion legislation, presented early this year, didn't get out of the Committee. Based on valid objections made by industry, they'll try to put together a new bill to submit later. END

*(Next month we'll examine the Treasury Department's case, the feelings of the Ways and Means Committee—and venture a few predictions of what's ahead in percentage depletion.)*

*Two modern vertical kilns produce high-quality clinker with low-grade fuel*

# Shaft kilns solve fuel problem in Australia

by Dr. Steven Gottlieb*

A MAJOR STUMBLING-BLOCK to economical cement production—unsatisfactory performance of low-grade available fuels—has been overcome. Now it is possible to produce, in a modern shaft-type kiln, high-quality clinker using high-volatile fuels or fuel mixtures. It is now being done in Australia.

This information, of importance to many regions of the world, has resulted from years of experimentation and continuous improvement by Gippsland Industries, Ltd., which I serve as managing director. When I designed our shaft-kiln plant in Traralgon, Gippsland, Victoria, I set about to cope with problems common to many of us: Markets are small and far apart, high-grade materials are not generally available and transport costs are high. After five years of operation, we are realizing many advantages from process techniques that circumstances fairly forced upon us.

Four years ago, when our plant had been in operation for a year, I was happy to announce in ROCK PRODUCTS, "Cement can be made efficiently

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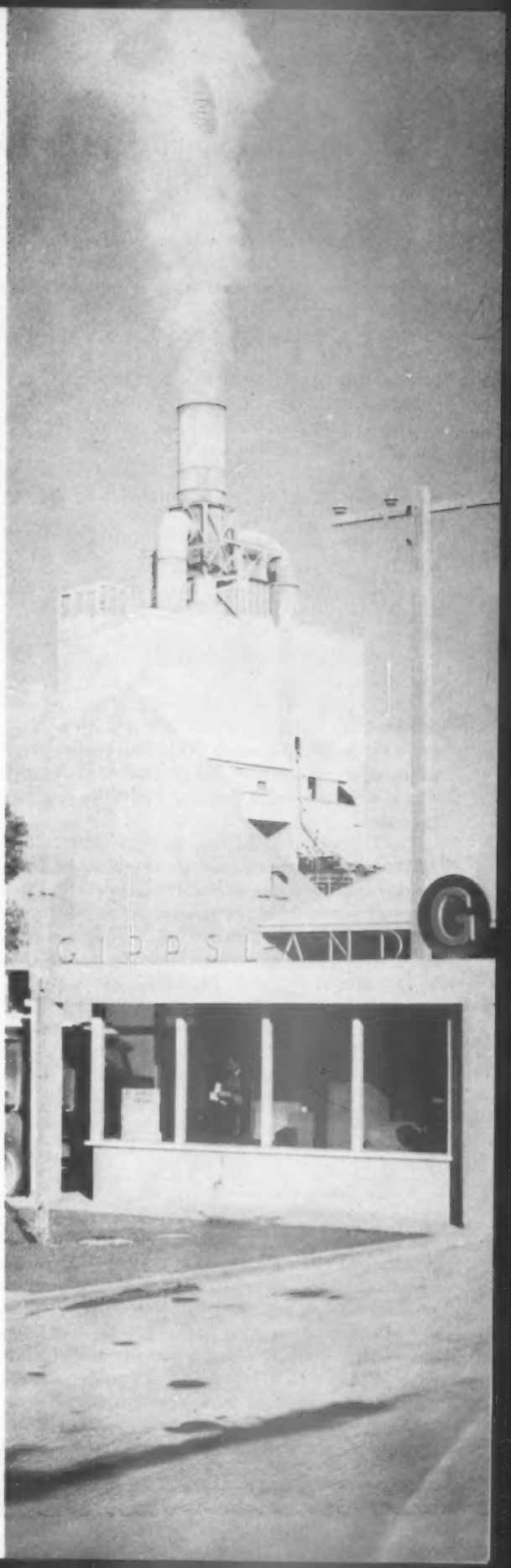


*Managing Director, Gippsland Industries, Ltd., South Melbourne, Australia

## SHAFT KILNS SOLVE FUEL PROBLEM IN AUSTRALIA, *continued from p. 89*

in a shaft kiln." We had installed the less expensive shaft kiln because we needed a plant that was economical to build and whose output we could sell locally on a profitable basis. (See ROCK PRODUCTS, August 1955, p. 122.)

Now I can report improvements in plant operation since 1955 which, besides increasing our yearly capacity from 40,000 to 120,000 tons of high-early strength cement, are permitting us to manufacture high-grade portland cement entirely from locally available resources. This applies today to all principal raw materials: limestone, marl, fuel, gypsum and bauxite. We now are operating a two-kiln plant.

Our experience so far has proved that not only is it possible to use the low-grade coal available in our area, it is profitable as well. A very low calorific value (due to the excessive moisture content in the coal) permits the proportioning of relatively larger quantities of coal to raw meal, thus presenting larger surfaces for heat transfer. The greatest recent advances in shaft-kiln technique were achieved by more accurate proportioning devices for raw meal and coal. This naturally can be achieved more easily if the amount of coal proportioned to raw meal is larger, due to its low calorific value.

The Gippsland plant had no easy time fulfilling all the conditions required by the use of the low-grade coals available in the area. However, during the two years of experimental work which were necessary for investigation, it became clear that if: (1) the problems connected with the plasticity of raw meal for nodule formation are solved, (2) the necessary density to protect fuel volatiles is achieved and (3) the fuel ash is of the right composition, the use of low-grade fuels present special advantages in respect to heat transfer, thermal stability of nodules in the preheating zone and clinker porosity—in other words, uniformity and grindability.

**Apart from the possibilty of using low-grade fuels,** the new type of vertical-kiln cement plant has also other important advantages. It can be established economically for a cement production as low as 20,000 tpy., although a one-kiln unit can produce 70,000 tpy. in continuous operation. Too, the kiln can be stopped under fire as long as two days without disadvantage, making weekly interruption of production possible. Thus, output of cement can be reduced if warranted. On the other hand, a serious disadvantage of the shaft kiln is its limited production, as even with the most up-to-date kilns the maximum production capacity from one kiln is only slightly above 200 tons for 24 hours.

Of all the problems that beset us in the design and operation of the Gippsland plant, the thorniest was how to use the low-grade coal in the area. Its high moisture and, particularly, its high volatile content made it necessary to redesign and reconstruct certain features of the kiln. Difficulties arising from this application have been solved one by one.

**The first objective of intensive research** and experimentation was the nodulizer. When the pan-type nodulizer was successfully introduced into modern cement manufacture in a Swiss plant in 1948, great improvements in kiln operation and cement quality were achieved. The quality of clinker, however, was still slightly behind the product from up-to-date rotary kilns. Despite its success, the nodulizer (see ROCK PRODUCTS, October 1950, p. 113) was unsuitable to operate with high-volatile coals. All attempts to improve its performance by the introduction, among other items, of a great variety of scraping devices failed. Recently several leading firms in Europe introduced rotating scrapers which, although greatly improving the quality and uniformity of the nodules, did not solve the problem of the escaping volatile matter of the fuel.

We knew that to achieve sufficient protection of the high-volatile coal particles, nodulizing had to be performed in such a way that all coal particles would be adequately protected by a layer of moist raw meal when entering the kiln. This condition could, of course, never be achieved with presses forming various kinds of briquettes—neither could it be achieved with the type of nodulizer introduced in Switzerland.

Nodulizing as it operates today, after two years of continuous improvements of its design, produces nodules in which coal is deeply embedded. No coal particles are visible on or near the surface.

However, the modifications on the nodulizer were not sufficient to prevent the escape of volatiles from the mass of nodules lying immediately above the hot zone. Although ignition of the coal containing even as high as 40 percent volatile matter is delayed by sound nodulizing, a considerable quantity of volatile matter escapes in the preheating zone through the pores of the nodule layers after dehydration is completed. Introduction of air from the top of the kiln in countercurrent

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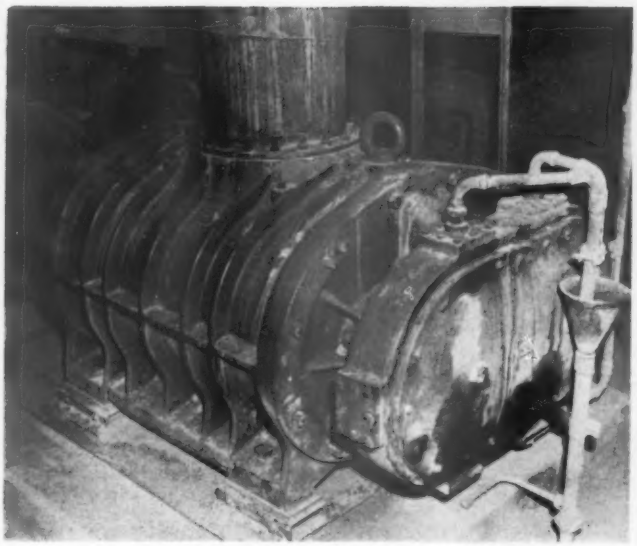
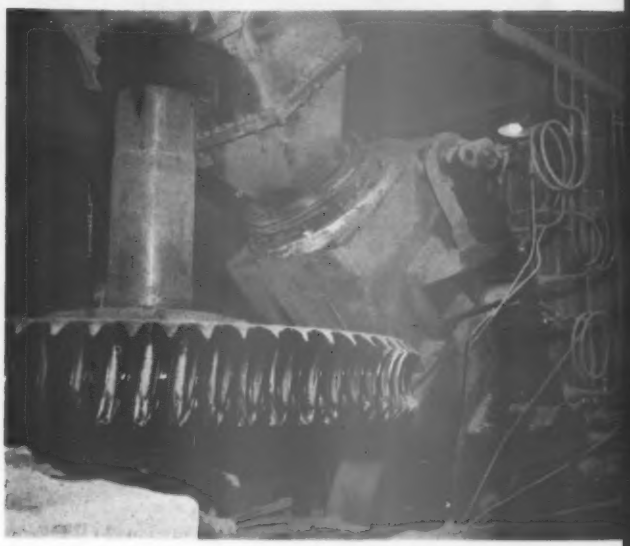
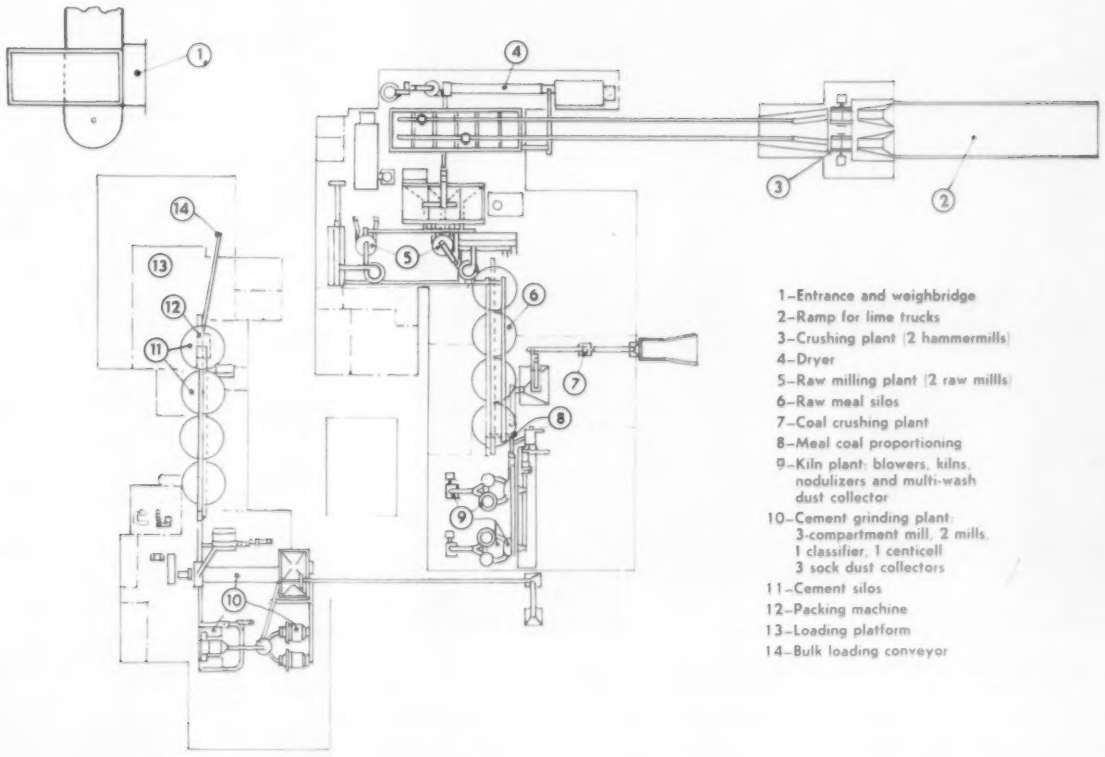


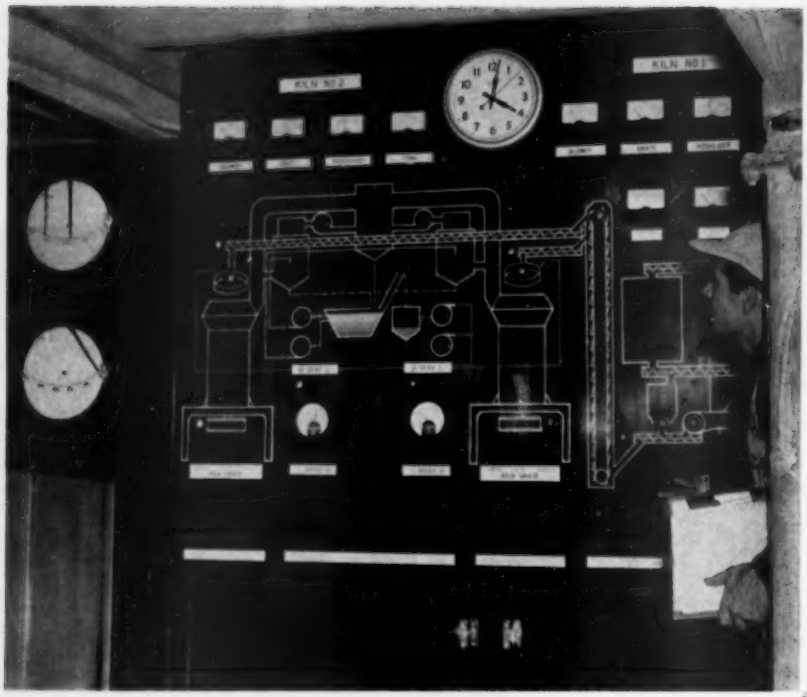


FROM BEGINNING TO END, two phases of clinker production are aided by kiln blower (left) and kiln grate drive and discharge (right)

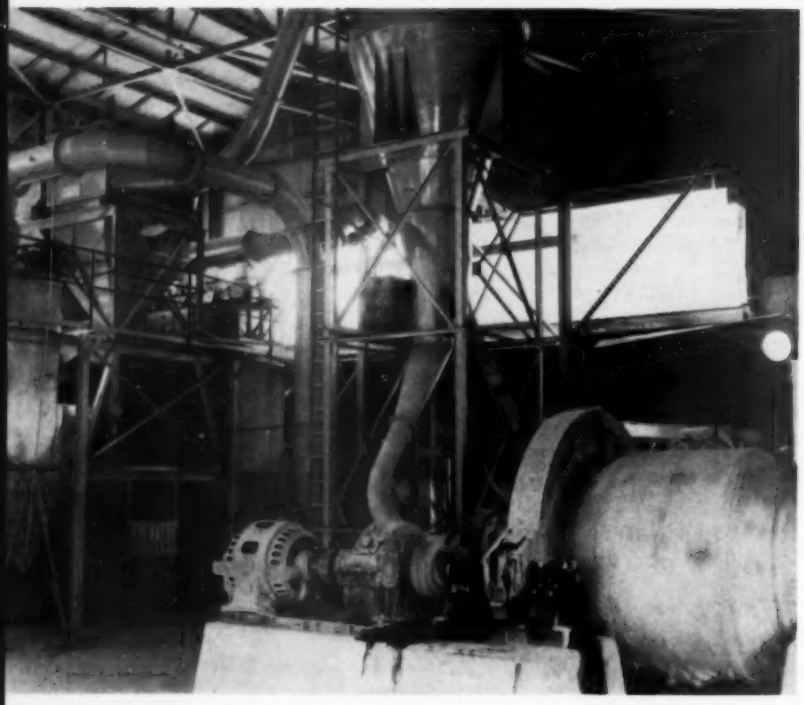
FLOW SHEET of Gippsland Industries' cement plant in Traralgon, Victoria, Australia




1–Entrance and weighbridge
2–Ramp for lime trucks
3–Crushing plant (2 hammermills)
4–Dryer
5–Raw milling plant (2 raw millls)
6–Raw meal silos
7–Coal crushing plant
8–Meal coal proportioning
9–Kiln plant: blowers, kilns, nodulizers and multi-wash dust collector
10–Cement grinding plant: 3-compartment mill, 2 mills, 1 classifier, 1 centicell 3 sock dust collectors
11–Cement silos
12–Packing machine
13–Loading platform
14–Bulk loading conveyor



THIS CENTRALIZED PANEL controls operation of the two shaft kilns



FOR FINISH GRINDING, clinker is conveyed into a 3-compartment tube mill

CEMENT CLINKER as it leaves the kiln is uniform and grindable

## SHAFT KILNS SOLVE FUEL PROBLEM IN AUSTRALIA, *continued from p. 91*

stream to the main quantity of air ascending from the bottom was designed to solve this problem.

The origin of this type of air introduction from the top of the kiln goes back to the design of an oil-fired vertical kiln developed during World War II and described in ROCK PRODUCTS in October 1950, p. 114. In this oil-fired kiln an air pipe descending from the top of the kiln toward its center had a bell-shaped extended bottom, creating a vaporizing chamber in which atomized oil droplets changed into gas. This gas, together with the air and recirculated flue gas blown in through the central pipe, entered the material charge of the kiln in opposite direction to the air blown in underneath the rotary grate. The opposing air and gas streams creating strongly turbulent flows at high velocities improved the rate of heat transfer to a considerable extent.

Although the air inlet of the shaft kiln using high-volatile fuel is much shorter than the primary air pipe used for the oil-fired kiln, it works on similar principles: Creating turbulent high-velocity gas flows, it promotes heat transfer. The air introduced at the top of the kiln provides oxygen into a zone where temperature is high enough to cause the volatiles to escape, but normally there is no air in this zone and no opportunity for ignition of the volatile gases.

After some hard times of experimenting, during which the secondary air inlet had to be redesigned several times, we found that it affected other important features of kiln operation as well. The ignition of volatile matter above the hot zone provided convenient preheating of nodules, which made it easier to maintain "center fire" in the kiln relatively high. The conical top section of the kiln, originally designed by Dr. Eberhard Spohn, thereby was used to its fullest advantage. This cone was designed to follow the shrinkage of the nodules while changing into clinker. One of the most difficult features of conventional kilns without air introduction from the top is to perform sintering within the cone and not much below it; in that case, the cone isn't used for its designed purpose.

**Even in the most modern kilns** using conventional shaft-kiln fuels, i.e., coke or anthracite, heat is transferred from the glowing particles of fuel after they are ignited, and preheating of material above the hot zone is only done by the combustion gases by convective heat transfer. Although from the standpoint of heat transfer this is a very economical process, it has serious disadvantages. The fuel particle radiates heat to its surroundings like a little sun; it heats up its immediate surroundings to a much higher temperature than the meal particles further away. Furthermore, after the fuel particle has burnt out, it leaves a structure of ash which not only melts at a lower temperature than necessary for clinker formation, but also produces low melting eutectics with the surrounding raw meal. These have little hydraulic value. Thus, where heat transfer conditions are most favorable, quality deterioration must follow consequent to low melting eutectics.

The larger the size of the fuel particles, using coke or anthracite, the more pronounced are these ill effects. Cement scientists and shaft-kiln operators have tried to overcome them by finer fuel sizing or by grinding coke or anthracite together with the raw meal into a fine black powder ("black-meal process"—see ROCK PRODUCTS, February 1959, p. 96). This appears to be a promising method to solve the difficulties created by ash contamination. Furthermore, it is possible that the reaction between $CaCO_3$ and finely divided coke or anthracite, leading to CO formation, extends the process of heat transfer from solid-to-solid to gas-to-solid. This must naturally create more uniform sintering conditions and lead to better process and better product.

It is possible that the grinding-in also of high-volatile coals could be realized to advance shaft-kiln technique further. Shifting the heat transfer process even more toward utilizing the heat content of high-velocity turbulent gas would result in less and less reliance on heat radiation from stationary glowing fuel particles. I am keenly interested in the new development of grinding-in fuel with the raw materials. A conical rotary grate specially adapted for this purpose permits uniform discharge of highly porous clinker, as described by Spohn and Woermann in the above mentioned issue of ROCK PRODUCTS for February 1959.

**Using high-volatile coals, the charge in the kiln** moves much more easily, with less tendency to adhere to the walls. This serves to keep the hot zone in the center of the kiln higher, nearer to the top surface of the material level in the kiln, than when using coke or anthracite.

With the large percentage of heat transfer effected by hot gases, the residual effect of ash formation from the glowing fuel particles became of secondary importance. Thus, the formation of the highest quality clinker became possible in the modern shaft kiln using high-volatile coal. One of

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## SHAFT KILNS SOLVE FUEL PROBLEM IN AUSTRALIA, *continued from p. 93*

the leading authorities in U.S.A., Nathan C. Rockwood, said in one of his "Notes" (ROCK PRODUCTS, March 1959, p. 20):

"The composition of the clinker [in a rotary kiln] depends not merely on the accuracy of the raw mix, temperature and speed of the rotary kiln at any one time, but since it is essentially a chemical process depending on solid to solid reaction, the result is greatly affected by the relative sizes of the raw material particles in contact or their access to each other at the required temperature at the right moment. Hence, it is not just a question of correct proportions of raw material, but whether they are mutually in a reactive form at a certain time, which because of the nature of the process is rather limited.

"The bringing together of the raw materials under the best conditions for the chemical reaction in the rotary kiln process is thus more or less accidental, while in the shaft kiln the pellets can be very accurately and uniformly proportioned. The much longer time for the pelletized raw materials and fuel to go through the shaft kiln, with the slower but more thorough sintering, may be a distinct advantage in producing a more uniform or homogeneous clinker."

**Good clinker quality was achieved** with the new shaft kilns using high-volatile coal. Prospects of further progress appear to be bright. Apart from the favorable setting and soundness properties and high strength of the cement which can be produced with the new process, there is the very great advantage of eliminating the alkalis from the raw materials during the burning process. Alkalis—various compounds of sodium and potassium present in nearly all marls and shales—are evaporated at approximately 1,472 deg. F.; thus, they escape from the hot zone of a rotary kiln but precipitate again behind the calcining zone. There is no way for alkali fumes to escape with the flue gases from a rotary kiln; they can only escape with clinker.

In modern shaft kilns, sintering commences 2 ft. from the top material layer, and the velocity of the gases is so great that the alkalis are carried out from the kiln. This is even more pronounced if high-volatile coals are used. The countercurrent gas streams increase velocity and turbulency, carrying out alkalies even to a greater extent than from the older type of shaft kilns. The $Na_2O$ and $K_2O$ content in Gippsland cement never exceeds .25 percent. However, this great advantage of cement quality is bought at a cost of heavy expenditure on the dust collecting side, as alkalis in a finely divided aerosol-fog contaminate the atmosphere quite seriously. Electrostatic dust precipitators could not work at the prevailing low flue-gas temperatures; therefore, the two kilns were equipped with wash columns.

The flow sheet shows shaft-kiln cement plant in Gippsland. Raw material, limestone and marl are dumped by trucks from a concrete ramp into two hammermills with movable breaker plates to prevent clogging. A centralized pushbutton control panel masterminds the operation of the raw material crushing and handling plant. One-percent Gippsland bauxite is added for better control of fusion in the kilns.

The raw materials are ground in two airswept Loesche-type grinding mills which dry and grind in one operation. These mills are economical, producing at a rate of 26 to 27 tph. of raw meal at a total consumption of 600 hp. to a fineness of 13 to 15 percent residue on 170 mesh. The raw meal is blended in four air-fluidized raw meal silos and added to the precrushed coal in the required proportion. The coal-meal mix is split into two streams and fed to the nodulizers, each situated above the vertical kiln. A rotating spreader distributes nodules into the kiln. Flue gases from the kilns pass through the multiwash columns and onto a water spray condenser-column before they enter the atmosphere. The sludge formed from the dust in the multiwash columns and the condenser is fed into a rake classifier and returned to the kilns.

The clinker discharges through the rotary grates and hydraulically operated triple-lock bucket devices into a high-frequency, vibrating tube conveyor which feeds through a clinker crusher and elevator into the storage area.

Air is introduced into each kiln from the bottom by rotary blowers as well as from the top into both kilns.

**The kilns are insulated on their outer shells** by fiberglass layers. Correctly designed insulation improves kiln performance greatly, counteracting one of the previous great disadvantages of shaft-kiln operation. (See ZEMENT KALK GIPS, April 1959, p. 136.) This disadvantage was the varying degree of heat radiation from the different layers of material in the kiln. While there was practically no heat radiation loss from or near the kiln center, there was increasing radiation loss toward its circumference. This loss was naturally greatest near the firebrick lining. Improvement of firebrick

*Please turn to page 156*

*A parts cost control system should be organized in the simplest manner possible*

# How a simple record can save you money

by Leo Bunds*

A SIMPLE RECORD OF THE COST AND SERVICE of each equipment part can save money for you, just as it has for Pacific Cement & Aggregates, Inc. I know from experience that it would be impossible to make equipment-parts changes in our plants at Eliot and Centerville, Calif., without a record showing what has been done in the past.

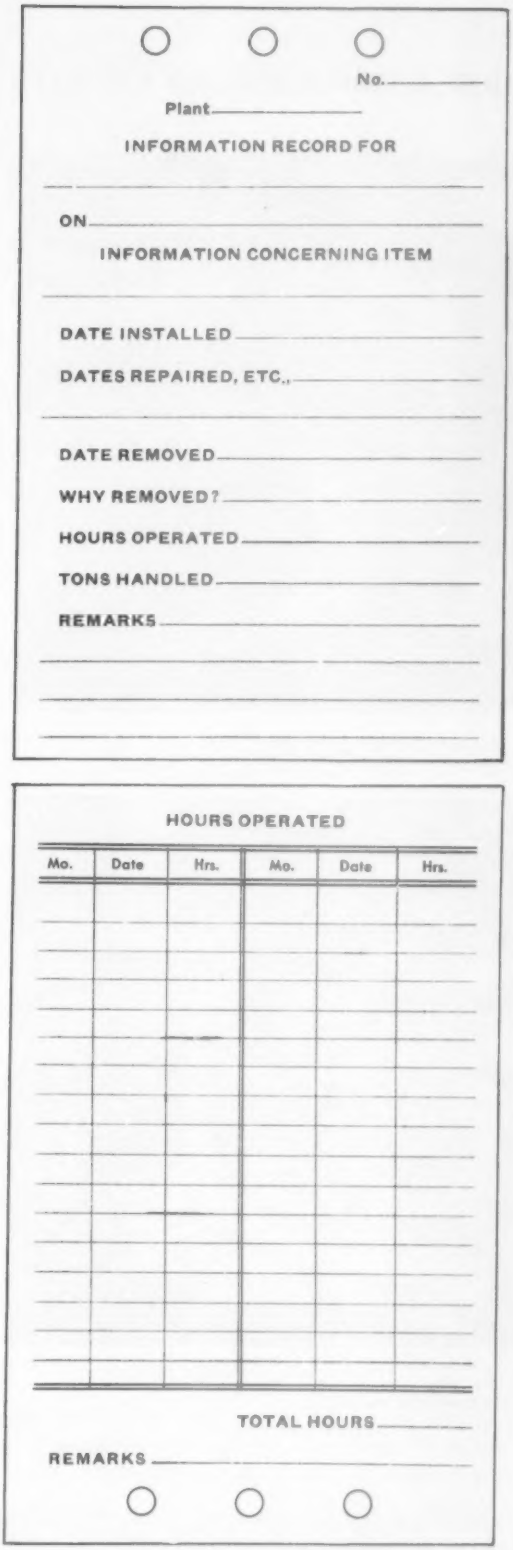
It is not necessary to go into a lot of detail to get results. In fact, a parts-cost control system should be organized in the simplest possible manner. At our plants, the setup for keeping these various cost and service records works like this:

**We have control boards in our offices.** These hold cards with the information necessary to aid us in studying a proposed change. The cards also have the information needed to keep a performance record of parts that have proved reliable in the past, but which might suffer mishandling in the future.

Each card shows the name of the part and the date it was put into use. We then can follow the performance of the part from the time of installation until it is removed from service. At this time, we complete our card by showing the length of service in hours.

We do not put tonnage records on the cards. If

*Please turn page*




THIS IS THE CARD used by Pacific Cement & Aggregates

*District Operations Manager, Pacific Cement & Aggregates, Inc.

## HOW A SIMPLE RECORD CAN SAVE YOU MONEY, *continued from p. 95*

PLANT CLERK Ordie Sober posts cost control board at company's Eliot plant

ALL ITEMS in stock are tagged and stored in an orderly manner

necessary, the tonnage records can be worked out from our plant reports.

From the cards, we make up a cost-control book at the end of each year that we can use for yearly comparisons.

You have to start a cost-control program with your stock cards. They must be kept in first-class shape to furnish you with a good basis for your program. Most of our stock cards list the price of the part at the most recent purchase.

The next move is to keep the plant storeroom in shape. The parts in stock must be kept in an orderly manner and must be properly tagged to encourage the various repair people to help you in keeping cost records.

At Eliot, we are beginning to show the part costs on our stock tags. I think it will pay to let the fellows using these materials know how much they cost. This should encourage them to help the company in saving on part replacements.

**Keep your storeroom in first-class order** at all times. If you let it go, sooner or later you're going to be faced with the job of putting it straight, and this can cause you to lose the good will of your people.

Here are some of the things we have learned and accomplished at Eliot and Centerville by keeping records of the service received from various parts:

Cables are one example of the savings possible through our cost-control system. Records show us whether the vendor supplied us with first-class wire rope. The vendor cannot let cable lie around his warehouse for a long time and then ship it to us, just hoping we will get good service out of it. If we don't, our records will show us we didn't. They also provide us with a comparison between the service received from good cable and the service received from the inferior cable.

But we also check the condition of our sheaves and drums, and if we are in the clear there, we send the poor cable back to the vendor. We find it necessary to return a shipment of cable two or three times a year for credit. But when we do, we have the clear record to back our claim. Records give you this type of information. Without a record of some kind you have no idea of what you are doing.

In the past, we have used 140 ft. of cable on our crane closing lines. We now order 160 ft., because we found that only 20 ft. receive the worst wear over the sheaves. We now cut this 20 ft. off and start all over again.

And, by using our records, we have changed to hemp center cables on the closing lines. We are getting the same service that we got in the past from iron-center wire rope—and in some cases better service—at a savings each year.

A switch from manganese to alloy bucket teeth was made possible by our cost records, too. Our records gave us the information necessary to increase the length of the teeth by 2 in. Because of these changes, we are saving the cost difference between the expensive manganese teeth and the cheaper alloy teeth. We are also saving on labor costs because, with the longer teeth, we now make fewer bucket-teeth changes.

Besides being cheaper, the alloy teeth proved to be more suitable to our operations. With the additional wear from the extra 2 in., we are now getting approximately 75 to 100 hr. more service out of our bucket teeth. Without these records I don't think we could have made these decisions on a firm basis.

**Our belts are kept in top operating condition.** We handled more than 12 million tons with the last Eliot pit-belt and more than 15 million tons with the last loading belt.

Cost records have proved that it's cheaper to spend money on belt repairs than it is to let belts go to pot. We are now using cold-patches when necessary. Sometimes we also find it necessary to call in outside vulcanizing help. This is needed when a belt has a bad tear or a big hole that most cold-patches can't handle.

Information from our records has also converted us to monel flexible belt facings. The monel lacings are giving five times more service than less expensive types of lacing put out by the same company.

**We are keeping a record on our conveyor idlers.** We have tried several different types, but we are still sticking with the sealed-for-life rollers.

Some of our belts at Eliot are turning over at 640 fpm. We used 1,680 bearings in our troughing idlers at Eliot last year. We are keeping records and are trying out different types of troughing idlers, and some day we hope to cut down this number.

Eliot has more than 4,000 troughing idlers and approximately three miles of belt. Obviously it is quite a problem and requires a lot of thought before a change is made.

We were using 170-in. long screens at the Eliot plant until cost records showed us the light. Now we purchase screens in three sections, making it possible to rotate the bottom sections to the top of the screen, where screens suffer the most abuse.

We don't have exact figures to show the saving from this, but I would guess that we save approximately $3,000 a year. Again, this saving is made possible by records.

IT'S CHEAPER to spend money on these belts to keep them in top operating condition

We have also changed the wire sizes on screens a number of times, hoping cost records will show us the wire sizes best for our operations.

Here again, records helped us to make an improvement. Try this yourself and I think you'll have a lot of fun. The important thing is, don't be afraid to create problems by making changes; if you have good records, the problems won't be serious. Instead, you'll find yourself climbing out of the old rut and well on the way to real progress.

We used to recap a number of our large cobra tires. This has been stopped, because our records showed that it did not pay to recap.

We are getting approximately 3,000 hr. or 25,000 miles of service out of the cobra tires. With an eye on the cost records, we check tire pressures daily, and during the summer they are checked twice a day.

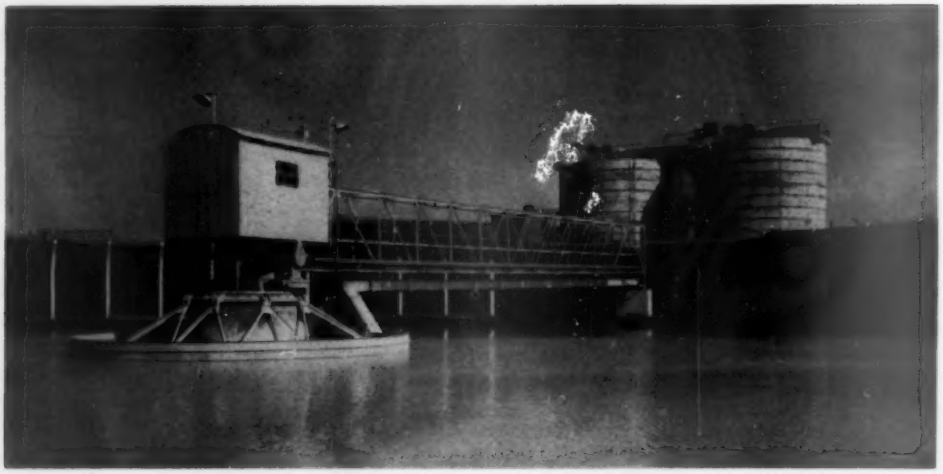
Roads are kept in good condition. A road grader is available and we use it. We found that it pays to run on a flat road, because the crowned road was producing uneven tire wear. With the flat road it is now unnecessary to rotate tires as often as we did with the crowned road.

We are starting a welding program at Eliot and Centerville that should produce results. Right now,

*Please turn to page 157*

**HYDRATION PLANT** where dolime is slaked with fresh water to a fine dry powder

**FOUR SEAWATER** storage tanks like these hold a total of 8 million gallons



**THIS VIEW** of one of the three reaction systems shows two reaction tanks and the settling tank (foreground)

*Ten-year research program pays off for British rock products producer*

# DOLOMITE UNLOCKS STRATEGIC MAGNESIA FROM SEAWATER

REFRACTORY GRADE MAGNESIA IS OBTAINED by reacting dolomitic lime with seawater. A $14-million plant of the Steetly Co., Ltd. at Hartlepool now produces approximately 3,000 tons a week of magnesia.

This is an important development in Great Britain which has no magnesite—vital raw material for an industrial country. The seawater process was tried on an experimental basis in 1937. Spurred by wartime needs, the process has been refined and production has increased steadily since then. Instead of importing magnesia from Austria, Great Britian now has an exportable surplus of this refractory material.

The site of the plant is a 24-acre plot in Durham on the bleak north east coast of England. This location was chosen for its nearness to a plentiful supply of high magnesium limestone as well as for access to the sea.

Graded dolomite from the company's quarries in Durham County is burnt in rotary kilns fired with pulverized coal to yield a high magnesium lime, "dolime," which is then transported to the plant by rail in hopper-bottom cars. The dolime is fed into five hydrator units, where it is slaked with fresh water to fine dry powder.

**For easy handling and to simplify mixing** with seawater, the hydrated product is made into a slurry. Classification to remove impurities introduced during calcination of the dolomite is the next step in the process.

Supplies of seawater are pumped directly to four storage tanks through 950-ft. long cast iron pipelines. Each of the five pipelines connecting sea to storage tank has its own centrifugal pump, operating at 25-ft. suction and driven by a 600-hp. electric motor. All five pumps are controlled from a central panel by one operator. Total capacity of the four tanks is 8 million gal., enough to insure a steady flow of seawater through the plant whatever the state of the tide.

Calcium carbonate is first removed from the seawater. Water from the storage tanks is fed into five pretreatment tanks where small quantities of dolime are added. The pretreatment tanks are fitted with variable speed central drive and diaphragm sludge pumps. The pretreated seawater is then pumped to the reaction tanks. Here it is mixed with the dolime slurry, and magnesium hydroxide is formed as a precipitate. The general reaction proceeds in this way: $CaO \& MgO + MgSO_4 \& MgCl_2 \& H_2O \rightarrow Mg(OH)_2 + CaSO_4 \& CaCl_2$.

**There are three reaction systems** at the plant. Each consists of two cylindrical reaction tanks fitted with agitators and one settling tank equipped with a continuously rotating thickener mechanism. The last of the settling tanks to be built is 255 ft. diam. and incorporates a cantilevered thickening mechanism which is the largest center-drive unit operating in Europe. Capacity of this tank is 3½-million gal. Together the three reaction systems process 30 million gal. of seawater every day.

Each pair of reaction tanks feeds a settling tank. After the hydroxide has settled, rotating rakes draw it to a center well from which it is pumped as a sludge to washing tanks containing seawater. The washed sludge is filtered on a battery of rotary vacuum-disc filters and the filter cake, containing about 50 percent solids, drops onto a conveyor which carries it to rotary kilns for calcination. This process decomposes the hydroxide, leaving a granular form of magnesium oxide.

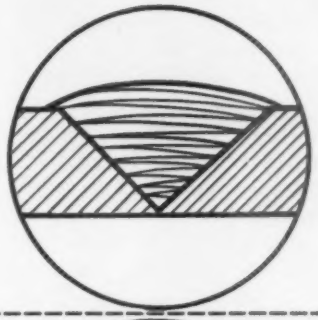
Five kilns, the biggest 250 ft. long, carry out this part of the process; each is equipped with an associated rotary cooler. The kilns are fired with

*Please turn to page 102*

A new
MANGANESE ELECTRODE
with unequalled weldability! *

# STOODY NICKEL MANGANESE

## WITH IRON POWDER COATING



*FOR JOINING*

*FOR BUILD-UP!*

New Stoody Nickel Manganese electrodes solve manganese welding problems in the field or in the shop! You'll find it unexcelled for joining manganese parts or building up worn areas on manganese equipment. Stoody Manganese is now produced as a solid core wire on which the alloying elements in an iron powder coating are extruded. Unusual welding properties are obtained *with physicals unexcelled in the industry!*

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**FEATURES:**

| | |
|---|---|
| Stable arc—No popping | Freedom from cracks |
| Easy re-strike | No porosity |
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Ask your Stoody Dealer for test samples...check speed and welding qualities, *test performance against every other manganese electrode you've ever used...* you'll find Stoody Nickel Manganese provides something *new* and *needed* in the industry!

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*(Based on tests by independent laboratory)*

| | DC Straight Polarity | DC Reverse Polarity |
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| Tensile Strength | 119,000 psi | 111,000 psi |
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| Elongation in 2" | 55% | 37.5% |

Hardness—Single pass on manganese steel;
as deposited—15 Rc, as work-hardened—48 Rc.
Two passes on manganese steel;
as deposited—18 Rc, as work-hardened—48 Rc.

*Be sure that your Maintenance Superintendent and Welding Foreman see this announcement!

**STOODY COMPANY**

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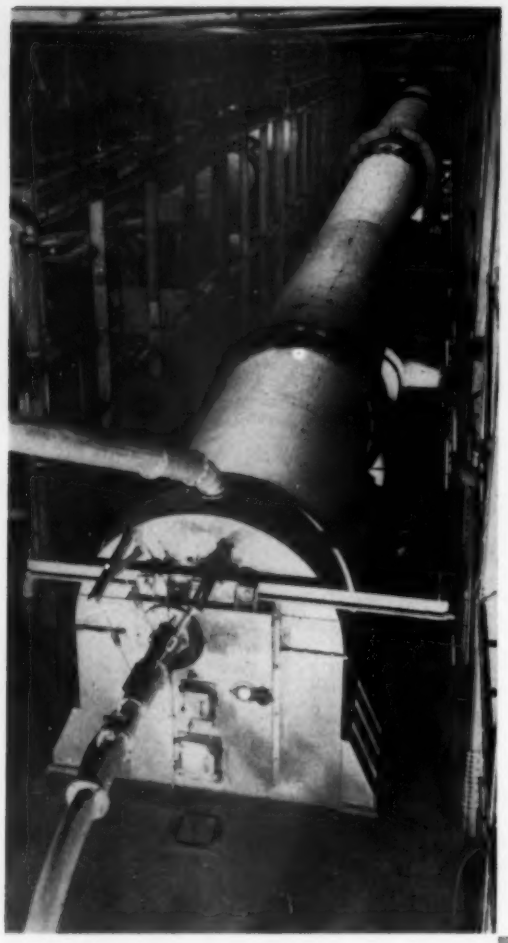
*Enter 1512 on Reader Card*

## DOLOMITE UNLOCKS STRATEGIC MAGNESIA FROM SEAWATER, *continued from p. 99*



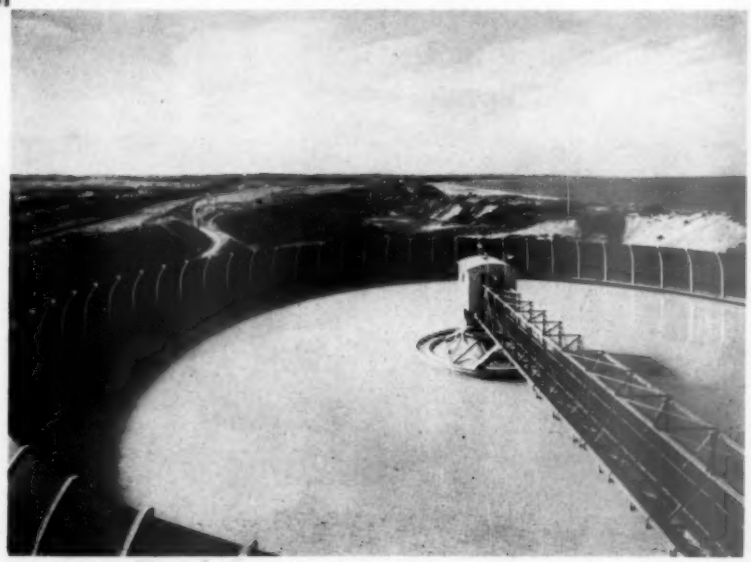
HERE IS ONE OF THE FIVE rotary kilns in which the magnesia granules are produced. Operating temperature of the kilns is over 1,600 deg. C.

pulverized coal, and operating temperature is over 1,600 deg. C. After cooling, the magnesia granules are bagged or dispatched in bulk to brickworks and steelworks, a considerable tonnage being shipped by rail to the refractory manufacturing plants of the Steetly Co. in other parts of England.

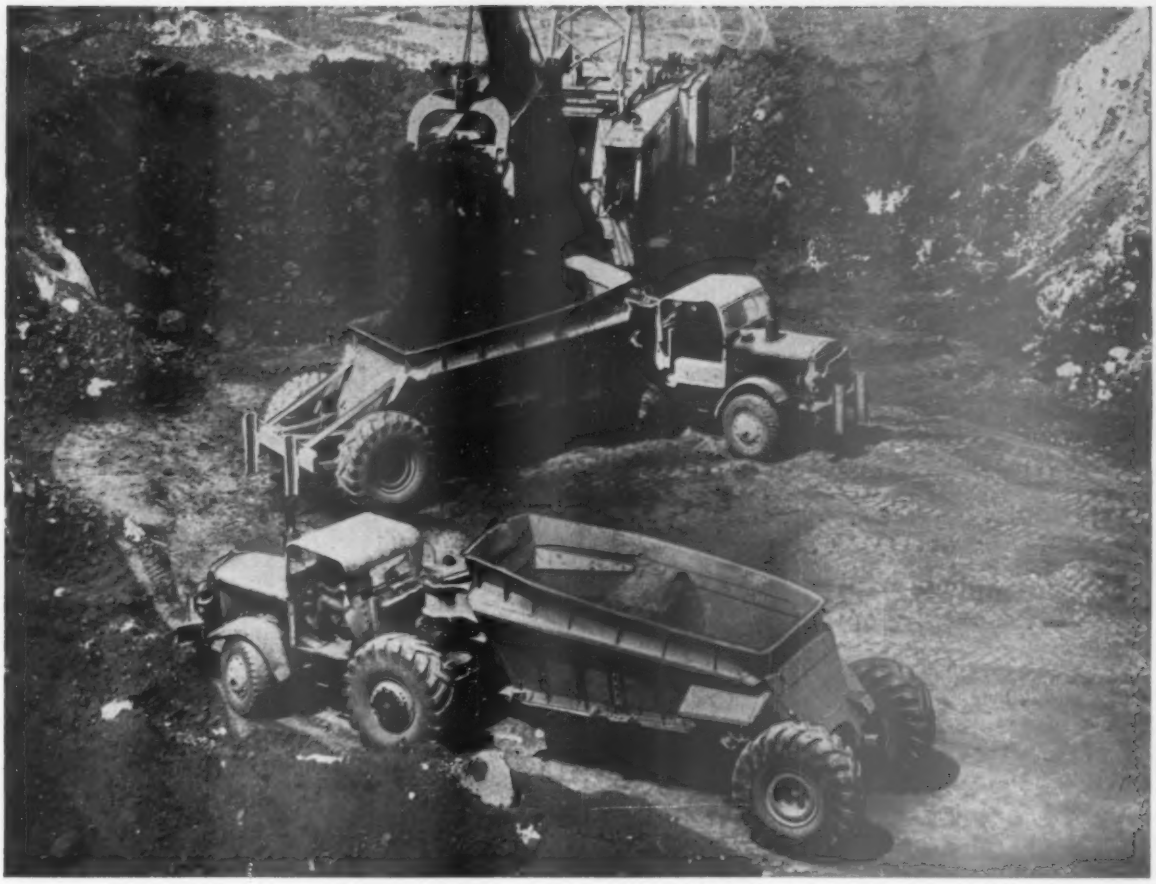
**The end product of the seawater-magnesia** plant contains a minimum of 90 percent magnesium oxide and is virtually inert to the action of atmospheric moisture. A typical analysis of the material is: calcium oxide, 2.7 percent; magnesium oxide, 93.0 percent; alumina, 0.7 percent; iron oxide, 2.0 percent; and silica, 1.6 percent.

Big factor contributing to the high standards being maintained is the extensive instrumentation used throughout the plant, particularly during the calcining process. Spray towers and electrostatic dust precipitators of 99.5 percent efficiency give a clean kiln gas discharge.

Economically, the plant is proving a real money-saver for Britain. Magnesia produced there is marketed at less than 75 percent of the import price—and in a full year this will save Britain about $11 million in foreign exchange. And independence from overseas sources has freed British refractory brick makers from previously imposed export restrictions on their products; result is that every year magnesite and chrome-magnesite bricks worth nearly $3 million will now earn money for Britain in the markets of the world. END



SETTLING TANKS are equipped with continuously rotating thickener mechanism



# 5 years of dependable performance at big bauxite mine in JAMAICA

The mining and export of bauxite ore for the production of aluminum is a major industry in Jamaica . . . one that is making an important contribution to the economic progress of this historically famous Caribbean island.

Reynolds Jamaica Mines Ltd. is one of the largest operations, shipping over a million tons of ore annually to plants of Reynolds Metals Co. in the United States. The red ore is loaded by big diesel power shovels into a fleet of 15 Euclid haulers — eight Bottom-Dumps of 15 cu. yd. capacity, and 7 Rear-Dumps that carry 22-ton payloads.

Hauls from the pits to the stockpile area are up to 7000′ in length — over marl-base roads cut through the tropical country — with adverse grades up to 6%. The "Eucs" make the one-way haul in an average of six minutes and work around the clock on a 3 shift 5 day week operation to feed the kilns and 6 mile overhead tramways to the ship docks in Ocho Rios.

The Euclid fleet has been on this continuous, rugged operation for 5 years and has maintained full production requirements. Excellent maintenance, combined with the built-in dependable performance of Euclid design, has resulted in very high machine availability for Reynolds Jamaica Mines.

For helpful facts and figures on how Euclid equipment — rear-dumps, bottom-dumps, scrapers and crawler tractors — can cut costs on your mine, quarry or construction jobs, contact the Euclid dealer in your area or write:

***Engineered to fit the job . . .***
***Euclids are your best investment***

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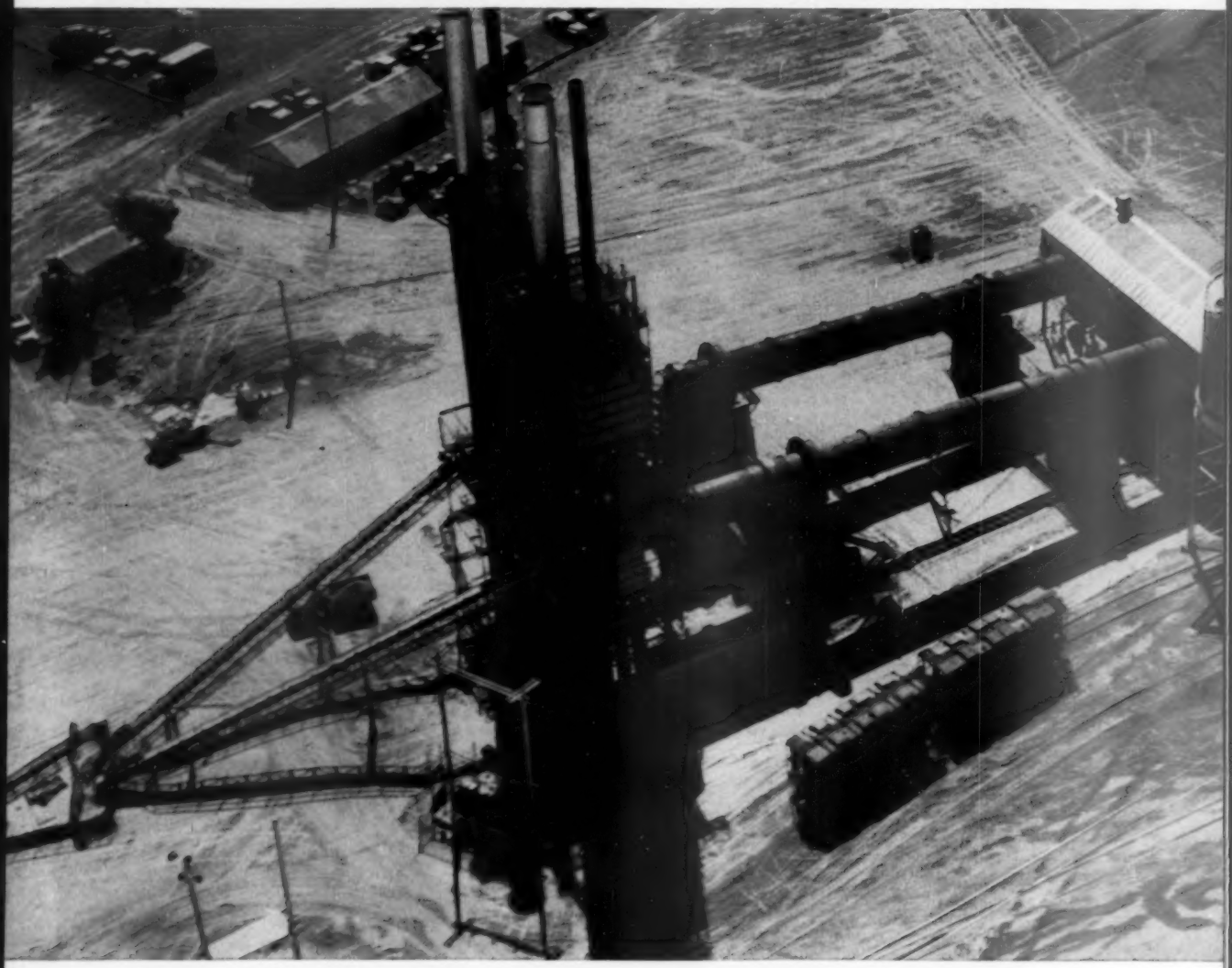

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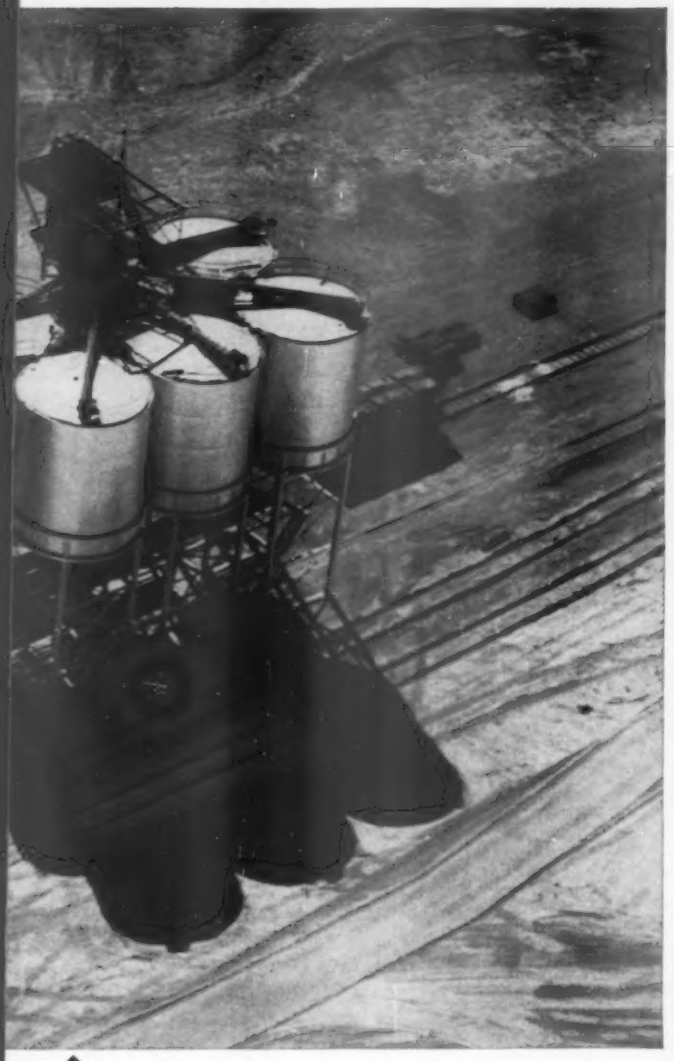
# Lime Plant

FLINTKOTE *Manufacturer of the broadest line of Building Products in America*



▲ Two 10'x 150' KENNEDY Rotary Kilns, with their KENNEDY Preheaters and Contact Coolers, are the principal components of this modern, efficient lime plant — designed by KENNEDY.

## ✓Check these KENNEDY features for

*High Output*

*High Quality*

*Low Fuel Consumption*

*Low Maintenance*

*Minimum Labor Requirements*

- **KENNEDY** Stone Preheater
- **KENNEDY** Short-2 tire Rotary Kiln
- **KENNEDY** Contact Cooler
- **KENNEDY** Natural Gas Burner— specially designed for Rotary Kilns
- **KENNEDY** Centralized Kiln Control Cubicle

KENNEDY Lime Plants—throughout the world—are noteworthy for their DEPENDABILITY and PROFITABLE OPERATION

*Consult us for your lime processing needs—Equipment—Design—Complete Lime Plants.*

PULVERIZED COAL FIRING SYSTEMS • HYDRATORS

*To cut beneficiating costs, American Aggregates has installed an air-operated jig—something brand new to the aggregates field*

# Air jig saves beneficiating dollars

by Kneeland A. Godfrey, Jr.

WHICH BENEFICIATING RIG WOULD YOU CHOOSE? Here is your problem: You've been successfully working your deposit near Kalamazoo, Mich., for 24 years, and have had the present 300-tph. sand and gravel plant working there for 13 years. Your location is good for serving the market in southeastern Michigan.

But you have a serious problem. State specs for gravel have been getting stiffer right along, and today they are so tough that your product cannot meet some requirements. Such materials as chert, shale, coal and hard, absorbent sandstone must be minimized to guarantee that you meet the specs, which often call for less than 8 to 10 percent combined deleterious. What do you do?

Your name, by the way, is American Aggregates Corp., Greenville, Ohio, a 20-plant firm with operations in Ohio, Indiana and Michigan.

You've examined several beneficiating techniques, and now have heavy-media separators, Ball-type scrubbers and jigs in use at various plants. You've found that each has its advantages, and that while one type may excel under given conditions, another will best it at a second plant. For Kalamazoo, you choose a 150-tph. Baum air-operated jig, brand new to the gravel industry. Used widely in the coal industry for 25 years, today the big Baum units are the most popular for

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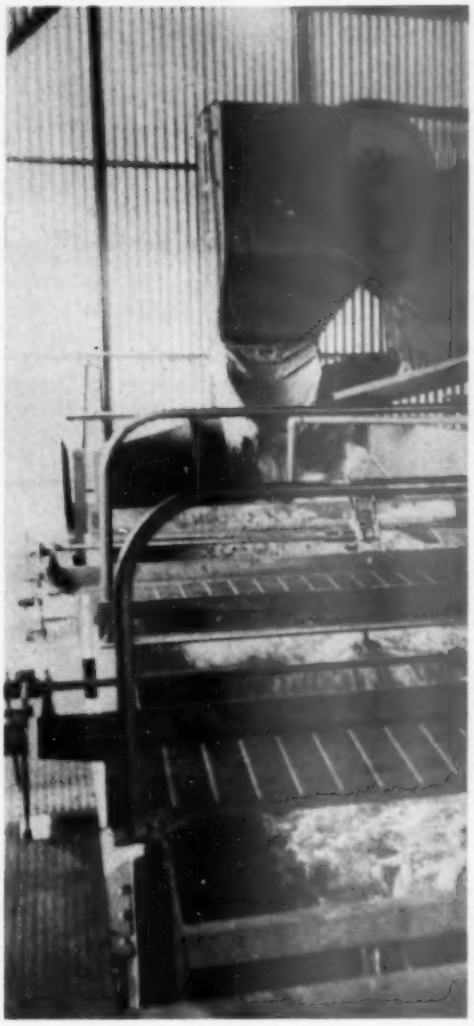
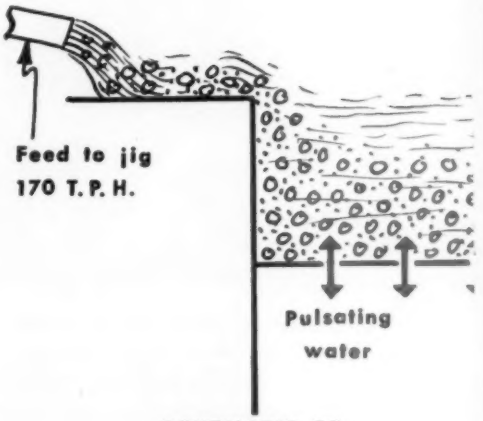
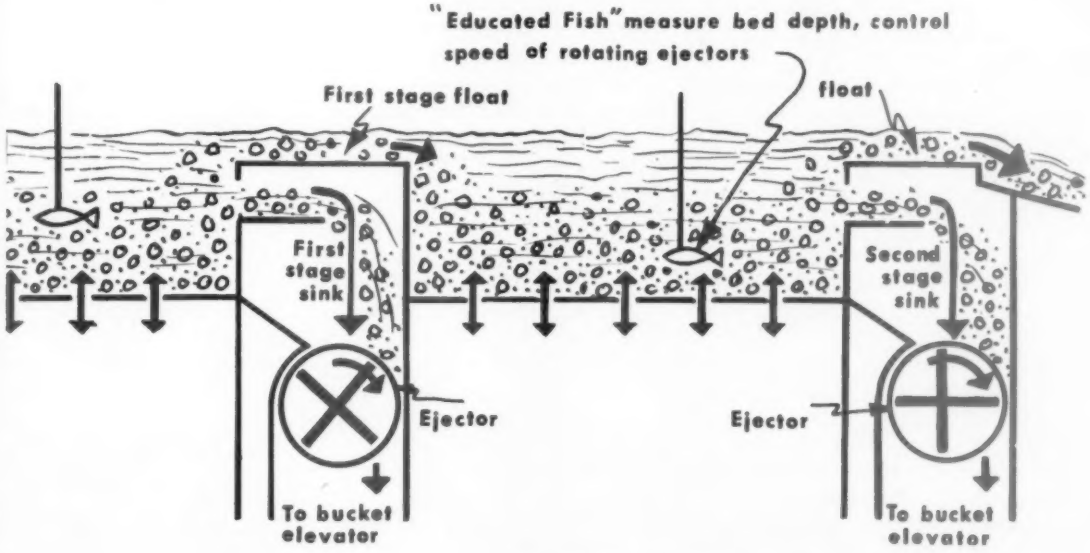


ABOUT 170 TPH. OF GRAVEL




SCHEMATIC OF
2-COMPARTMENT BAUM JIG

and 4,500 gpm. of water travel through the jig plant. Maintenance man Willie Fullbright stands facing two large bucket elevators (which remove sink) and small rotary air valves which control jigging



## AIR JIG SAVES BENEFICIATING DOLLARS, *continued from p. 107*

removing heavy noncombustibles from coal, their maker states.

But as used at your plant, instead of floating off the usable coal, the "sink" or heavy, sound gravel is what you save. The weak, unsound particles are wasted or sold at a low price.

Already in its second season at Kalamazoo, the big air-operated jig is performing capably. It is fed all the 3/16 x 1½-in. gravel reaching the plant, upgrades it enough to meet State Highway Dept. specs for "A" gravel. Cost per ton to operate the unit shouldn't greatly exceed 10 cents, reports M. G. Kerr, vice president for the Michigan Division.

Experience has taught the firm much about beneficiating. American Aggregates' Green Oak, Mich., plant has had a 300-tph. heavy-media plant working, and very satisfactorily, for five years. And a similar processing plant will be installed at the nearby Oxford, Mich., plant, and will see service early in 1960.

While your Baum jig is new to your operations, you have great confidence in it. Two similar units were installed at your Columbus, Ohio, plant about the time the Kalamazoo plant's jig was put to work. They, too, are doing a fine job of upgrading sub-specification material.

**Air operation is the key to success,** rather than the pulsating diaphragm found in many jigs. Actually, the only difference between the Baum jig and diaphragm units is in the way the water is pulsated. Air pressure does the job in the Baum jig. By using rotary air valves, the 48-cycle per min. up-down motion of the water can be controlled more precisely than in diaphragm jigs.

Studying the jigging process, you find that "opening" of the bed of gravel in the unit is crucial. All gravel particles must be separated momentarily in the jig so the unit can do its job; at this moment the bed of gravel has opened.

As with all jigs, opening takes place as the water drops—as air pressure is quickly exhausted from the jig. This partial vacuum causes the water level in the bed of gravel to drop quickly, faster in fact than gravity alone could do the job.

By this clever device, a ticklish problem is solved. In a stationary body of water, particles of high specific gravity sink faster than lighter ones. This is logical, and it's the basis for most beneficiation rigs. But, unfortunately, large particles also sink faster than smaller ones of the same specific gravity. That's where this very fast downpulse in the air jig does a better job than other units. American Aggregates vice president W. E. Hole, Jr., notes that "as a particle is given a downward acceleration in water in excess of that imposed by the force of gravity . . . specific gravity becomes the only factor in determining velocity." In other words, particle size no longer matters. The Baum jig will separate pit run material, removing large and small particles at the same rate and with equal efficiency.

The rotary air valves do another good job—they separate or "open" a much thicker bed than other jig designs. At Kalamazoo, you're using a 12-in. bed depth and getting good results. This cuts cost per ton, for production per square foot of screen area is boosted.

**The payoff: more business at low cost.** Today you are meeting Michigan state highway specifications for most concrete gravels. And this concrete aggregate business accounts for at least 25 percent of your sales—an important part of your 500,000-tpy. operation. Besides this, your ready-mix business (50 percent of sales) has improved, too. Portions of this concrete go into highway jobs—and you're sure now that you can meet specs. There's no doubt that the jig is doing a valuable job. As noted earlier, the added cost for beneficiating is not greatly above 10 cents a ton.

The jig consists of two compartments in series, uses them to make an accurate "split" between heavy and light (unwanted) gravel. The entire 170-tph. flow of 1½ x 3/16-in. gravel is first processed in the first compartment of the two-compartment jig. It makes a separation at a somewhat higher specific gravity than the 2.58 desired for the finished gravel. In this way, all lightweight particles plus some sound gravel is retained in the float from the first compartment. The second compartment is identical, but since it is fed the float from the first, it receives only one third as much gravel. With this smaller charge, it makes a fairly precise finished "cut" at 2.58, insuring about the most accurate specific-gravity separation possible with jigs.

The Kalamazoo plant's unit is an 84-in., two-compartment, four-cell jig with 84 sq. ft. of screen area. Standing 24 ft. high and 20 ft. long, the big black unit is accessible from all three floors of the new plant built to house it.

After only a scalping to remove sand, the 1½ x 3/16-in. gravel reaches the plant at an average rate of 170 tph. Sound or sink gravel leaves the

*Please turn to page 110*

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*another Olin Mathieson packaging idea!*

# SKID-MASTER

## Tough kraft multiwalls...with a non-skid finish you can't see or feel!

Don't sacrifice strength, good looks, or printability for skid-proofing! Skid-Master multiwall bags provide protection against sliding damage with an "invisible" non-skid finish built right into the paper itself! No sticky coatings, tacky sprays, or surface grit... just clean, tough, non-skid kraft! Call or wire Olin Mathieson today: Packaging Division, W. Monroe, La.

OLIN MATHIESON PACKAGING DIVISION

FROSTKRAFT IS A TRADEMARK

## AIR JIG SAVES BENEFICIATING DOLLARS, *continued from p. 108*

new jig plant at 145 tph., returning to the gravel plant nearby for final screening, washing and storage over a reclaim tunnel.

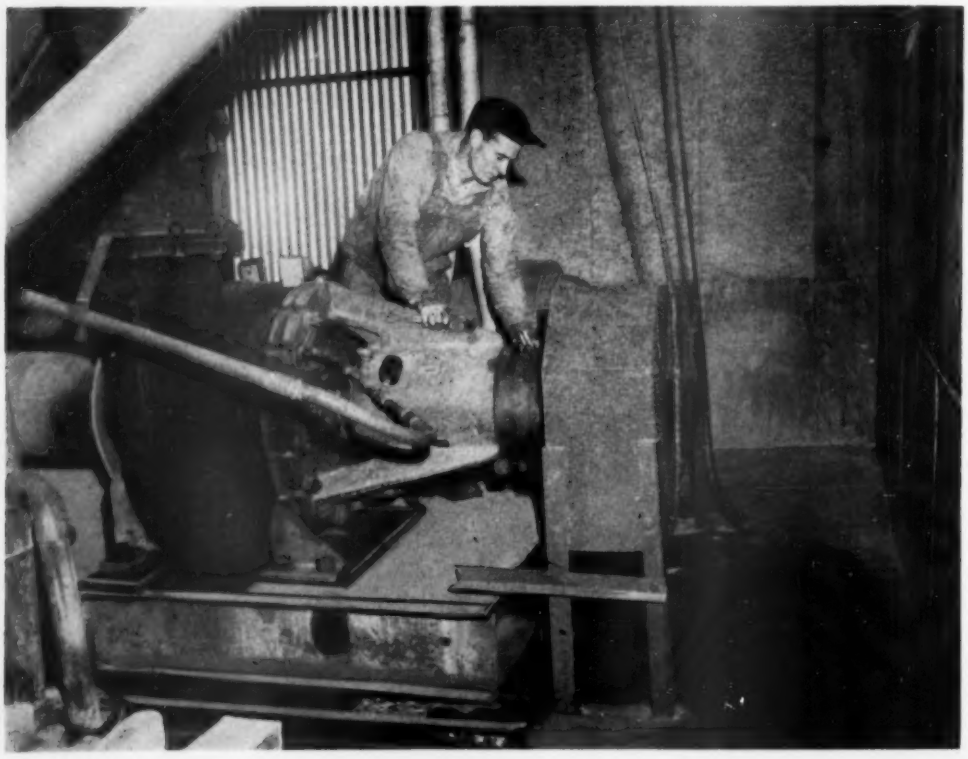
Costs were shrewdly cut by using the "float" as well. Clearly 200 tpd. of waste float gravel accumulating at the plant would be a nuisance, and hauling it away would be costly. So American Aggregates found a happy solution: most float is crushed and then sold as a fully-crushed, dust-filled material. The low-cost stone works well as driveway, parking lot and highway sub-base material. More important than eliminating a nuisance, revenue from this operation helps cut beneficiating costs for the sound gravel.

Float is found in all sizes in the 1½ x 3/16-in. fraction fed to the jig. Three major pieces of accessory equipment in the jig plant process it. Smallest float fraction, ½ x 3/16-in., is separated out by a twin-deck, 5 x 10-ft. dewatering screen. It is then conveyed outside the building to a truck-load bin, from which it is wasted.

Water, slime and occasional minus 3/16-in. fines drop from the screen to a water clarification tank. Here most solids settle out and are removed to waste by a 3-in. solids pump. The partly clarified wash water then returns to the jig through a big 14 x 12-in. centrifugal pump at 3,900 gpm. In this way only about 600 gpm. of makeup water is needed to maintain the 40,000 gal. charge in the jig.

From the dewatering screen, the retained 1½ x ½-in. float gravel drops to a 3-ft. short-head cone crusher for reduction to a minus ½-in. product. The crusher is in closed circuit with a 3 x 8-ft. single-deck stone screen which follows it in the process flow. Plus ½-in. float gravel is next recycled for crushing, while the finished, minus ½-in. all-crushed product rises by belt conveyor to a stockpile beside the jig plant. From this ground storage pile, it is reclaimed by tractor shovel and loaded into delivery trucks.

By coming up with a departure from the normal aggregate-industry practice, American Aggregates has found a unit which easily processes 170 tph. of gravel, reduces deleterious content to meet specifications, and does so at a favorable cost per ton.



BIG centrifugal pump keeps water circulating back through jig and settling tank at 3,900 gpm.



Enter 1466 on Reader Card

## Bucyrus-Erie

# BALANCED ENGINEERING

## keeps trucks on the move

How can you be *sure* of high production? Consider this: *more quarry and mine operators depend on Bucyrus-Erie electric shovels than any other.* Performance on the job proves that they are more rugged, stay on the job longer, require less service and maintenance.

Behind this kind of performance is Bucyrus-Erie *Balanced Engineering* . . . engineering that makes sure that all components are soundly designed, soundly built. The voltage control system is an example. It delivers fast acceleration and deceleration the instant you need it . . . gives you high torque at low speeds, high speeds at low torque . . . and is designed to be *consistently dependable.*

For the complete story on *Balanced Engineering,* write Bucyrus-Erie Company, South Milwaukee, Wisconsin, Dept. 2LH.

*Bucyrus-Erie means . . .*

**Balanced Engineering**

BUCYRUS ERIE®

Michigan Dozer operator has excellent view of blade.

# High-speed Michigan Dozer expands

## *Nevada firm reduces handling costs 25%*

Nacon Company, Inc is a Las Vegas firm that *doesn't* take chances when buying equipment. "Gambling belongs in the casinos!" says Tom Stewart, president of Nacon. "Before *we* lay out $50,000 or so for any big dozer, we *demand* on-the-job demonstrations.

"Our latest demonstration really proved profitable. In the hopes of boosting crusher-feed production, we tried a rubber-tired Michigan Dozer. The output of this rig really surprised us. Tests showed the 375 hp Model 380 could push enough material to our crusher to produce 400 tons of spec stone per hour—*even at distances up to 400 feet*. No competitively-priced rig came close to this production. We talked it over with our Michigan Distributor, Graid Equipment Company . . . and bought!"

The Michigan's first job was on a 9-mile excavating-grading-structures section of new four-lane blacktop Federal Interstate Highway near Las Vegas. Here, Nacon's contract called for several hundred thousand tons of roadway base and sub-base gravel (3,250 lb/yd) in three grades—select bankrun, #1 and #2 stone. Michigan's share was to dig out and push all this material to the crusher. It did . . . at an *average* work speed of 3 to 7 mph!

### Production up 20 to 30%

Output averaged 400 tons per hour . . . 20 to 30% higher than Nacon's estimates with other machines . . . at a per-ton cost "about 25% lower." And since the high-speed Michigan could economically work longer distances, Nacon didn't have to move the crusher as often as with crawler-feeding. One set-up handles as much as 315,000 tons.

Bud Jacobsen, operator of the Model 380, likes the Michigan for more reasons than high production. "For one thing, it's easier riding," says Bud. "Tires absorb bumps and ruts so you can work faster on rough going. Second, you sit higher . . . have a better view of blade and of ledge and hopper edges. Third, Michigan handles easier . . . you change speeds and direction simply by moving little hydraulic levers *and without foot-clutching*. Its ease of handling, plus greater speed, adds up to *greater production than any crawler at any distance over 50 ft!*"

### Michigan Tractor Shovel loads 20 yd trucks in 2½ minutes

But the Model 380 Dozer isn't the only Michigan drawing praise around Nacon's crushing set-up. A 2¾ yd Model 175A Tractor Shovel is attracting attention as

# practical crusher feed distance to 400′

it handles stockpile loading. This unit heaps a typical 20 ton truck in only 5 passes, 2½ minutes . . . a typical 20 ton bottom-dump hauler in 4 passes, 2 minutes.

Output like this, day in and day out, speaks well of Nacon's job planning . . . also proves Michigans have what it takes to speed dozing and loading. See for yourself! Pick the rubber-tired Michigan Dozer you want to see, 162, 262, 375, or 600 hp . . . or the Michigan Tractor Shovel, 16 cubic feet to 6 cubic yards (standard SAE-rated capacity) . . . then ask your Michigan Distributor for a demonstration.

"Handyman" Michigan Tractor Shovel takes time out from truck loading to move 40 ft conveyor. Versatile unit also dug the 275 ft long, 20 ft wide, 1 to 10 feet deep hauler approach trench to storage bin (right) . . . served as ladder for workmen erecting the bin . . . handled backfilling and cleanup.

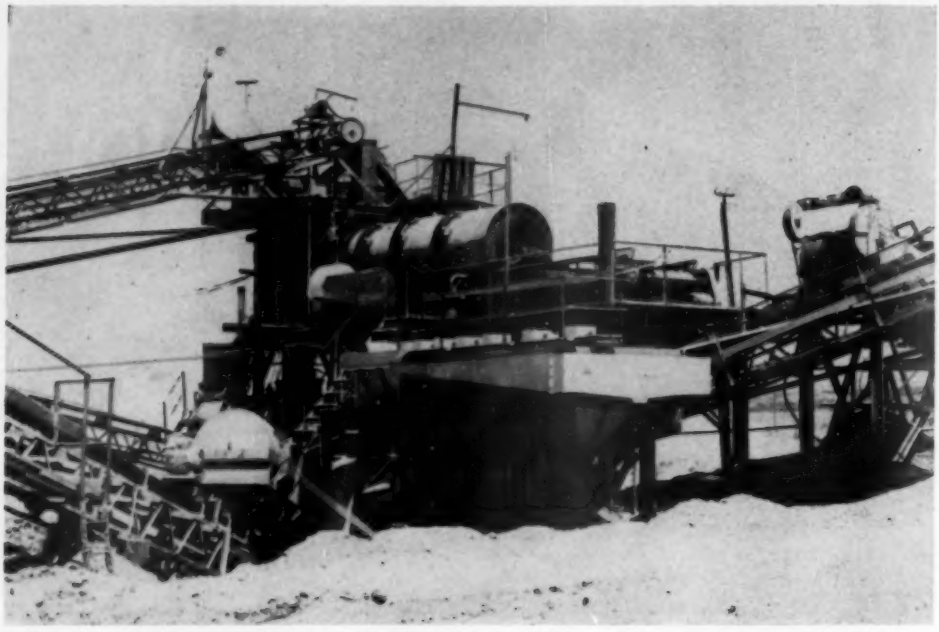
Michigan is a registered trademark of

**CLARK EQUIPMENT COMPANY**
**Construction Machinery Division**

CLARK® EQUIPMENT

2481 Pipestone Road
Benton Harbor 31, Michigan

In Canada:
Canadian Clark, Ltd.
St. Thomas, Ontario



THE ROTARY DRUM SCRUBBER is the heart of the wet preparation system

# ADD FINES, CUT SLIMES WITH NEW WASHING PLANT

by Ralph S. Torgerson

NEW WASHING AND FINE-SAND RECOVERY equipment is enabling H. G. Fenton Material Co., San Diego, to meet the tougher sand and gravel aggregate specifications of its highway department customers in California. This equipment supplements the dry crushing and screening equipment which makes all-crushed aggregates for bituminous concretes and sub-base mixes.

This firm's 250-tph. Otay plant south of San Diego, built in 1951, is a good example of Fenton's modernization program. The company recently added a seven-valve, free-settling classifying tank to recover a higher percentage of minus 100-mesh fines, to reduce the load on the spiral sand preparation machine which follows the classifying tank, and to reduce slimes carried to the settling pond.

Like many stream deposits in the area, the raw material ranges from fine sand to occasional boulders up to 30 in. diameter. The deposit is excavated with a dragline having a 3¼-cu. yd. bucket; the material is loaded into 15-ton haulage trucks for the two-mile haul to the plant. Here it is dumped over a 14 x 14-ft. rail-type grizzly. Five haulage units are used.

The plus 14-in. boulders are discarded at the grizzly and trucked away. Acceptable material passes through to a 30 in. x 120-ft. belt conveyor to a stationary 3 x 6-ft. grizzly with 4-in. openings. Oversize from this unit goes to a 22 x 36-in. jaw crusher. Crushed gravel joins through-grid material on another 30 in. x 120-ft. conveyor which discharges to a 4 x 10-ft. double-deck scalping screen. Oversize from the top deck, a plus 4-in. material, goes to a 4-ft. standard cone crusher. Oversize from the second deck, plus 2½ in., goes to a 3-ft. standard cone crusher.

A 6 x 24-ft. rotary drum scrubber takes through-screen fine gravel from the second deck. Here the material is thoroughly tumbled and washed. From

*Please turn to page 118*



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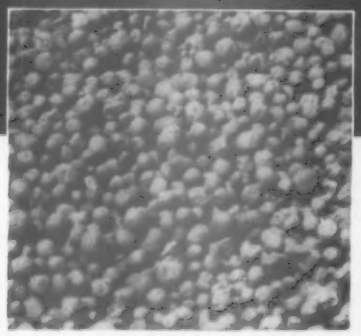

*Typical Mesabi Range material:* abrasive, heavy

# Rubber-tired machines the only practical solution

From a distance it looks like any other stockpiled material. Then you come close and you see *this is something different*—something that combines many of the worst characteristics of sand, gravel, even rock. It's abrasive. Dead. Heavy. You've heard the name. It's *taconite!* Processed taconite! Round pellets, varying from a half-inch to three-fourths inch in diameter, blue-gray in color, 63% pure iron.

When rubber-tired machines can handle such material *successfully*—day in and day out—with rubber's obvious advantages of mobility and no track wear—that's real news for maintenance-minded firms that have almost *any sort* of stockpile or feeding problem.

This Minnesota taconite plant has *five rubber-tired Michigans.* These include a 2¼ yd Model 175A, a 2 yd 125A, and two 1¼ yd 75A Tractor Shovels . . . and the 262 hp Model 280 Tractor Dozer pictured. The Tractor Dozer exemplifies Michigan advantages . . .

## Advantage No. 1—Tire Life

This 56,000 lb machine started work about a year ago. To date, its tires show virtually no wear. The machine does a variety of jobs. For example . . .

## Advantage No. 2—Mobility

1. Levels the multi-million ton taconite pellet and stockpiles. Machine works on 2-to-1 and 3-to-1 slopes, has surprised men on the job with its ability to climb steep grades on loose footing.

2. Cleans around the 10-yard pellet-loading shovel. Major advantage in this operation is way Michigan's low-pressure tires don't crush the pellets . . . a real problem with crawlers.

3. Maintains haul roads.

4. Tows disabled trucks.

5. Cleans spillage around distant pellet plant. Unit gets to this assignment, 2 miles away, at 28 mph, travels under own power without waste of lowboy loading or unloading, does no damage to RR tracks or blacktop roads.

6. Cleans under hopper. Here, operator dozes normally until he accumulates load. Then he hydraulically pivots blade back, lifts material, turns and dumps outside of rail tracks.

## Advantage No. 3—Dependability

Key to Michigan success, however, has been dependability! Entire power train of each machine—torque converter, power shift transmission, planetary axles—is designed and built by Clark, specifically engineered to give more usable power and traction than you've ever seen on rubber. Get the proof of a demonstration. Four Michigan Tractor Dozer models—162 to 600 hp—eight Michigan Tractor Shovels—16 cu ft to 6 cu yds—to choose from.

Michigan is a registered trademark of

**CLARK EQUIPMENT COMPANY**
**Construction Machinery Division**

CLARK® EQUIPMENT

2481 Pipestone Road
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Canadian Clark, Ltd.
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*Some straight talk on*

# How to judge which jaw crusher

You read a lot of claims these days, advertising the tonnage output of this or that make of crusher at various pits around the country. Accurate though these reports may be, the overall result can easily lead to confusion. Unless you know all the variables — and you seldom do — you have no way of knowing how the reported equipment would perform at *your* pit, the only one you're really concerned about.

The way we see it, there's only one sure way to judge crusher values, and that's to take a really close look inside the machines themselves. Compare jaw area, angle of nip, length of stroke, and frame design. These are the things that *make* for low-cost-per-ton production. They're measurable. They're comparable. They apply to any set of operating conditions.

> Put a rock under "X" amount of compression, and it either *will break* or it *won't* — there's no in-between. That's why even "small" differences in rock crusher design — an eighth-inch of stroke, one degree of nipping angle, 5% more stored flywheel energy — can make *big* differences in final performance. Don't be lulled into the belief that all makes of jaw *crushers perform alike!*

One word of caution. When you make any such comparison; be sure you judge *all* makes of crushers on *equal* terms. Here are some things to watch for:

JAW OPENING: Is rated jaw opening measured in forward, neutral, or open position? Lippmann measures its jaw opening in the *forward* or "closed" position (ratings based on neutral or open-jaw position merely make the crusher look bigger on paper). Every Grizzly-King size and model has its own specially-designed frame . . . no beefed-up ratings from next-smaller sizes.

RATED TPH CAPACITIES: In making comparisons of rated tonnage output, be sure you compare on the basis of "like" reduction ratios. (Most manufacturers don't even rate their machines — nor recommend running them — at reduction ratios permissible with Grizzly-King.)

Also keep in mind there's considerable latitude in the way rated capacities are determined. Variables such as hardness of rock, r.p.m., and power consumption all enter the picture. It all goes back to the point we made earlier — it's safer to judge a crusher by "how it's built," than by production claims alone.

HIGH-STRENGTH DESIGN: High production is important, but it's only half the story. The final test is how well the crusher will *stand up* under top-rated production, year in and year out. A look at the comparative chart and cutaway (opposite page) shows how Lippmann stacks up against competition — sweeps the field in high-strength, low-maintenance design.

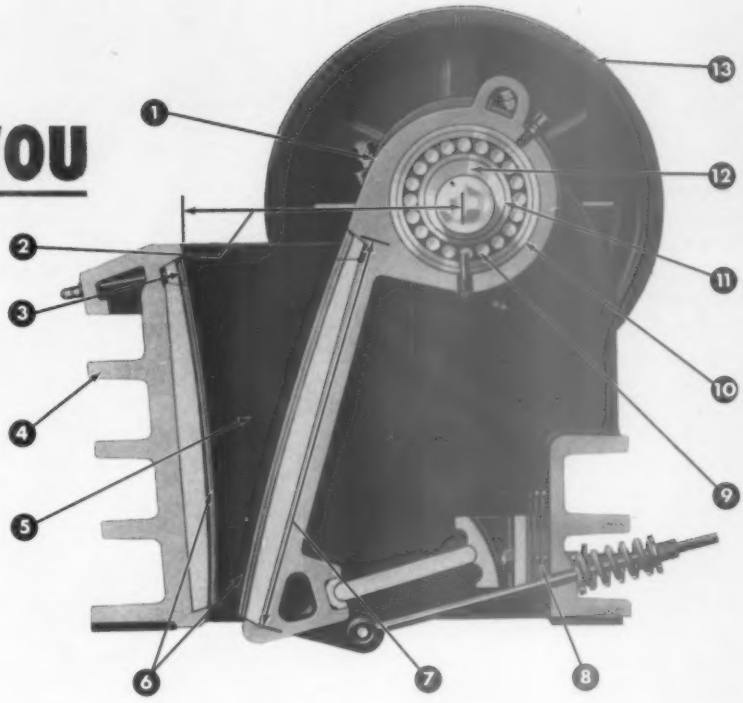
Naturally, you would expect to pay more for a crusher like this. But remember, it's *net cost per ton* over the life of the machine, not first costs, that determine your profit picture. *No* crusher is worth its price if it doesn't first give you what you set out to buy — a competitive bidding edge, and a good profit margin, on job after job. If you agree that this makes good business sense, you'll want to consider Grizzly-King before you invest in your next jaw crusher.

**Lippmann jaw crushers available in sizes 10x16 to 42x48. For specific facts related to *your* operation, use Rock Products inquiry card, or contact your Lippmann distributor.**

**LIPPMANN Engineering Works, Inc., Milwaukee 14, Wisconsin**

**Jaw, Roll, and Gyratory Crushers • Conveyors • Vibrating Screens • Apron Feeders • Pulverizers • Bins, Hoppers • Portable Crushing Plants**

# is best for you




**1.** Contoured upper-jaw area, of heat-treated special steel, permits larger-size feed, minimizes bridging by slabby or large-size rock.

**2.** Shaft, set farther back from front of crusher, allows larger size feed, also makes side-feeding possible.

**3.** Die wedge has positive clamping action across full width of die.

**4.** Heat-treated special steel monolithic frame is reinforced at critical points of stress with heavy cast ribs. Inside contact surfaces are fully machined.

**5.** Cheek plates are reversible for double wear, are made of special, highly abrasion-resistant alloy steel.

**6.** Curved jaw dies give non-choking action, are reversible for double wear, corrugated for increased breaking force.

**7.** Compare Grizzly-King's 82-inch-deep jaw with any other 30 x 42 crusher! Lippmann's extra jaw depth gives you up to 37% more crushing area . . . reduces angle of nip for more efficient crushing.

**8.** Positive setting control, by means of shims, prevents slippage, permits easy determination of discharge opening.

**9.** *Radial thrust tapered roller bearings* stand the gaff of heavy operating loads . . . can be field-adjusted for running clearance and for wear (not possible with ordinary radial or roller-type bearings).

**10.** *Bearing retainer* (not generally offered in competitive crushers) is specially designed to facilitate quick, simple demounting of bearings .

**11.** 13" dia. heat-treated shaft, forged of alloy steel, handles extreme overloads with ease. No properly operated and maintained Lippmann Crusher has ever had a shaft or bearing failure!

**12.** Full 1½" eccentric throw gives you up to 16% longer crushing stroke.

**13.** 4 tons of flywheel weight (60" diameter) stores up tremendous energy for efficient operation and low power consumption. Flywheels are dynamically balanced . . . positive locked for safety.

## Compare Lippmann Grizzly-King against any other make...here's the story on the 30x42

| Size: 30 x 42 | Grizzly King | Make "S" | Make "U" | Make "I" (1) | Make "D" | Make "L" (1) | Make "R" (1) | Make "G" | Make "P" |
|---|---|---|---|---|---|---|---|---|---|
| Lgth. of Swing Jaw Die | 82" | N.A. | 68.25 | 65" | 69" | 70" | 73" | 60" | 65" |
| Lgth. of Stat. Jaw Die | 75" | N.A. | 60½" | 57" | 62¼" | 66" | 69" | 55" | 60" |
| Length of Jaw Stroke | ¾" | N.A. | ⅝" | N.A. | ¾" | ⅝" | N.A. | ⅝" | ⅝" |
| Min. and Max. Discharge Opening | 3 to 10" | 3 to 6" | 4 to 8" | 6 to 15" | 4 to 8" | 4 to 8" | 4 to 8" | 3 to 10" | 4 to 8" |
| Shaft Dia. at Eccentric Brgs. | 12" | N.A. | 10.238" | 10.238" | 11" | 10¼" | 11" | 9½" | 9.450" |
| Capacity in TPH at 5" Opening | 300 | 200-255 | 183-270 | 140-240(2) | 110-450(3) | 150-225 | 140-200 | 130-200(4) | 250 |
| HP Required | 100-130 | 125-150 | 140-165 | 125-150 | 100-150 | 100-150 | 150 | 100-150 | 100-130 |
| Shipping Wt. | 64,000# | 60,500# | 42,000# | 48,000# | 56,000# | 47,000# | 46,900# | 46,000# | 40,850# |
| Adjustable running clearance on bearings | Yes | No | No | No | Yes | No | No | No | No |
| Oil lubrication throughout | Yes | No | No | No | No | Yes | No | No | Yes |
| Individual Jaw Brg. Protective Enclosure | Yes | No | No | No | No | No | No | No | No |

(1) Closest comparable size rating, 32 x 40 (2) At 6" opening (3) At 4 to 8" opening (4) At 4 to 6" opening
(data from latest available published literature)

F-C-6-59

*Enter 1491 on Reader Card*

## ADD FINES, CUT SLIMES WITH NEW WASHING PLANT, *continued from p. 114*

the scrubber, the material drops to a 4 x 12-ft. horizontal washing screen. The top deck merely protects the 3½-mesh deck below by spreading the material across the full width of the screen. All oversize goes to a coarse material washer. It is carried by belt conveyor to a 4 x 14-ft. double-deck screen on which the three sizes of finished coarse materials are produced.

**Three stacker belt conveyors move the three sizes** to stockpiles: a ⅜-in. pea gravel over a 110-ft. belt; a 1-in. maximum size on a 75-ft. belt, and a 1½-in. maximum size over a 125-ft. belt. Below the stockpiles is a 24 in. x 260-ft. reclaiming belt conveyor operating in a 11 x 11-ft. reinforced concrete tunnel. This conveyor loads trucks or transfers coarse aggregates to a belt conveyor leading to the concrete batching plant bins. Approximately 20,000 tons of coarse aggregate are stockpiled.

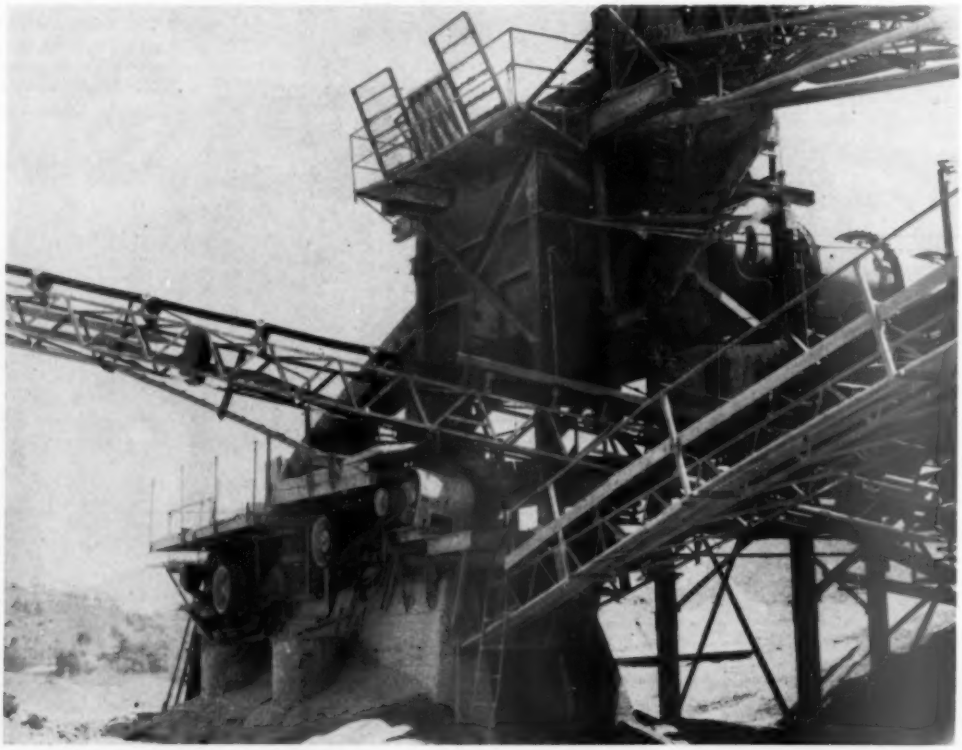
Through-screen sands from the 3½-mesh deck of the sand screen go to the new 8 x 27-ft., seven-valve classifying tank. Sand fractions settle in its V-bottom according to size, the slimes and water overflowing to the launder for disposal in a settling pond. The 3½ x 200-mesh sands drawn off through the discharge valves are sent to a 4 x 26-ft. triple-spiral sand preparation machine for further cleaning and dewatering. Some fresh water is added to the spiral sand preparation machine to improve cleaning effectiveness.

Finished sand is discharged to a 24 in. x 90-ft. belt conveyor, then to a 24 in. x 60-ft. horizontal shuttle belt conveyor for distributing over a 10,000-ton dewatering stockpile. Below the stockpile is a 96-in. corrugated steel pipe reclaiming tunnel in which a 24 in. x 70-ft. belt conveyor moves sand to a belt conveyor for the trip to the concrete batching plant bins.

**All-crushed aggregates are made by the three cone crushers.** These products can be diverted to an asphalt plant or to make an untreated road-base material.

A 24 in. x 130-ft. inclined belt takes the dry crushed products to a 4 x 10-ft. single-deck screen. The 1¼ x ½-in. oversize from this screen can be returned by belt conveyor to the 3-ft. shorthead

*Please turn to page 120*



MATERIALS for the dry products plant start from these three cone crushers



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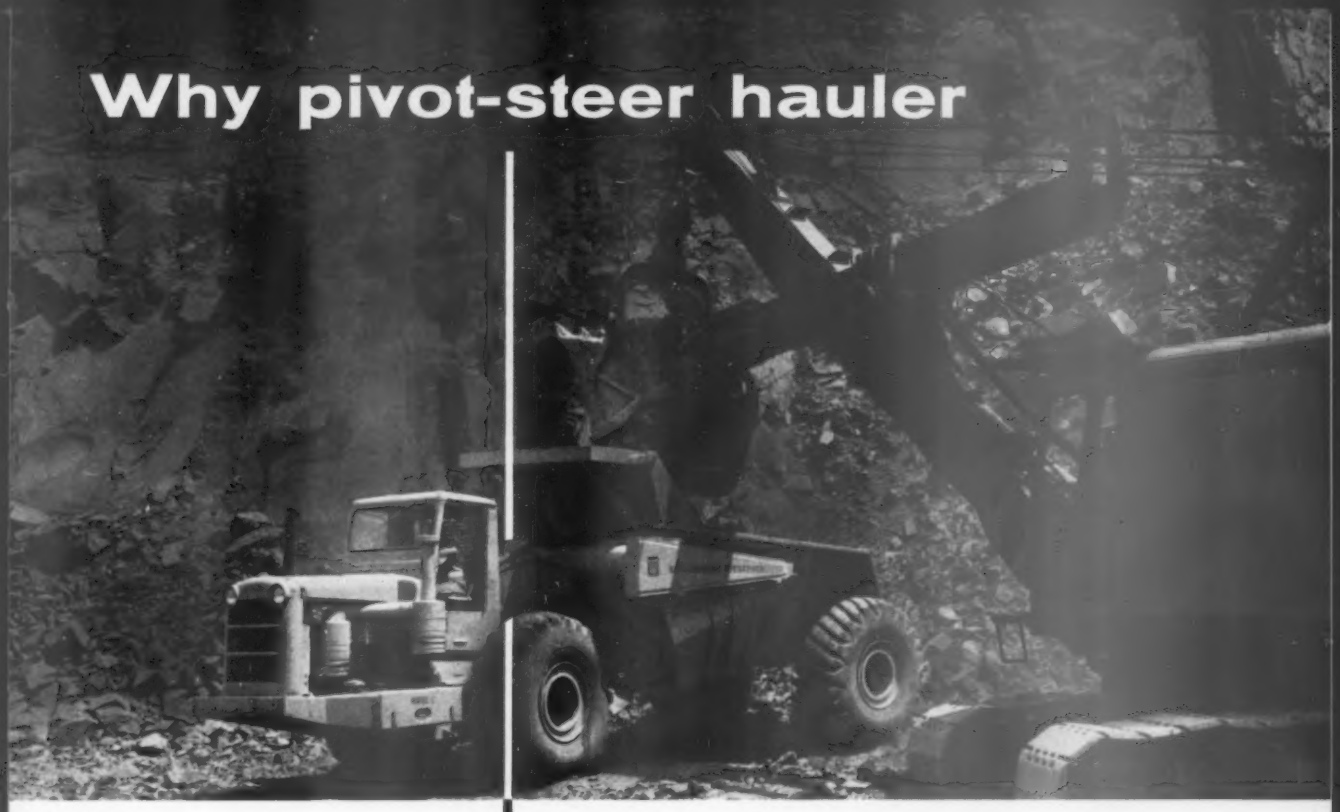
# Why pivot-steer hauler



## cuts equipment downtime... boosts pit output... lowers handling costs...

Rugged, simplified construction is one big reason why speedy LeTourneau-Westinghouse Tournapull® Rear-Dumps keep working efficiently day after day... year after year... to help pit owners cut costs. Notice that on this machine there are no springs, no tie rods, no hose and pipe lines, no frame, no long drive-shaft to require maintenance and repair.

In place of a foundation frame and body sub-frame, Tournapull prime-mover and trail-unit are hitched together by means of a high horizontal yoke. Yoke pivots horizontally on kingpin at front... then extends back along side of bowl, where it pivots vertically just above and ahead of rear wheels. This unique vertical and horizontal kingpin arrangement also provides an easy oscillating action that eliminates most twisting, tilting strains ...permits higher working speeds on uneven ground to boost pit output.

### Resists heaviest loading jolts

Shovel operator does not have to take it slow and easy when loading heavy materials. L-W Rear-Dump bowl is all steel — no wood fillers. Triple-layer floor is lined with heat-treated tool-steel strips, welded to solid billets laid over heavy steel plate. Sloping sides deflect load shock, quickly cushion floor area with layer of material to minimize rock damage.

### Tire, clutch, transmission wear reduced

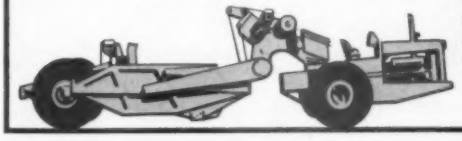
Costly wear on tires, clutch, and transmission caused by spinning wheels in slippery or loose footing, is minimized with Tournapull Rear-Dump. When either powered wheel begins to spin, unit's exclusive L-W power-transfer differential automatically diverts up to 80% of power to drive wheel on firmest footing. Also, electric 90° pivot-turn through geared kingpin, lets operator "walk" prime-mover out of mud or loose sand. Dumping action can also be used to "hump" empty hauler off a soft bank.

Features like these — plus full 90° turns, efficient electric-controls, fast, clean dump, giant air brakes, excellent visibility — add up to high production and low costs. Let us show you a LeTourneau-Westinghouse Tournapull Rear-Dump in action. Available in 3 sizes: 11, 22, and 35 tons.

B-1892-MQ-1

### Bonus interchangeability feature

For less than ¼ the cost of an L-W Tournapull prime-mover with Rear-Dump, you can get an easy-loading L-W scraper to interchange with original Rear-Dump trail-unit. Changeover — using same 2-wheel prime-mover — takes just a few hours. Use scraper to lower dirtmoving costs on stripping operations, haul-road or drainage construction, and for exploratory mining. Other trail-units to increase prime-mover's usefulness also available.



**LeTOURNEAU-WESTINGHOUSE COMPANY,** PEORIA, ILLINOIS

*A Subsidiary of Westinghouse Air Brake Company*

**Where quality is a habit**

## ADD FINES, CUT SLIMES WITH NEW WASHING PLANT, *continued from p. 118*

THE BATCHING BINS keep a fleet of 15 ready-mix trucks supplied with aggregates

ABOVE: One of five Euclid 15-ton haulage units transports material to plant, a two-mile haul

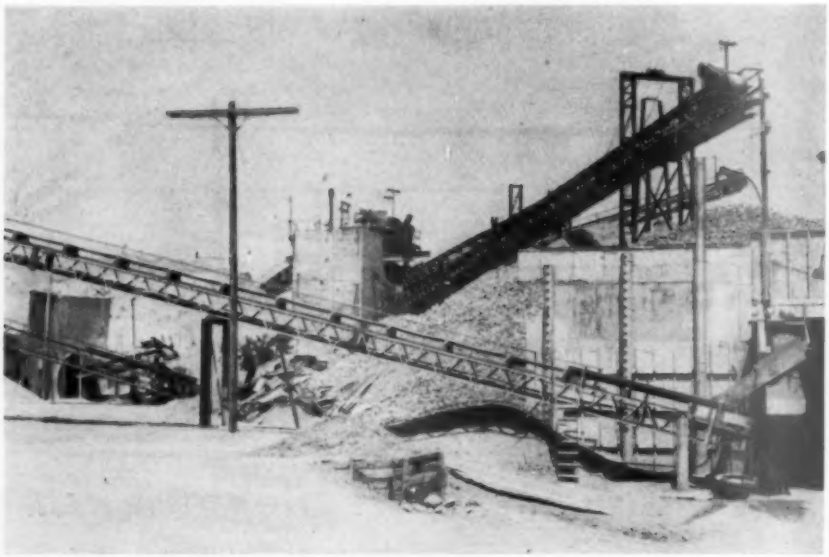
cone crusher, or may be sent back to the scrubber if more coarse material is desired for the wet plant. The minus ½-in. through-screen products can be returned in closed circuit to the inclined belt conveyor.

The throughs from the 4 x 10-ft. screen, a minus ½ in. material, are moved by a 24 in. x 90-ft. belt conveyor to a 42 in. x 12-ft. double-deck screen which produces four sizes: ½ in., ⅜ in., chips and dust. These products are chuted to bins from which they are transported by truck to an asphalt plant.

The dry untreated road-base material, ranging in size from 1½ in. down to 200 mesh, is made by diverting all or part of the material from the primary jaw crusher to a parallel belt conveyor which distributes the material to the cone crushers. The entire production of the cone crushers can be diverted for manufacture of road-base material. END

MAJOR EQUIPMENT REFERENCE

| | |
|---|---|
| Haulage units (5), 15-ton | Euclid Div., GMC |
| Jaw crusher, 22 x 36-in. | Iowa Mfg. Co. |
| Cone crushers, 4-ft. std. | Nordberg Mfg. Co. |
| 3-ft. std. | Nordberg Mfg. Co. |
| 3-ft. shorthead | Nordberg Mfg. Co. |
| Vibrating screens (4) | Nordberg Mfg. Co. |
| Scrubber, 6 x 24-ft. rotary | Madsen Works, Baldwin-Lima-Hamilton |
| Sand-sort classifier, 8 x 27-ft. | Western Mchy. Co. |
| Spiral sand preparation machine, 4 x 26-ft. | Western Mchy. Co. |
| Washer, 3 x 18-ft. | Eagle Iron Works |
| Fresh water pumps, 600 gpm. deep well | Layne-Bowler |
| 300 gpm. centrifugal | Worthington Corp. |



COMBINATION truck and reclaim tunnel taps the stored concrete aggregates



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# Should you build your own aggregate plant?

***The author believes that neither the savings expected nor any of the other possible advantages are realized***

by H. C. Pollitz*

APPARENTLY NOTHING IS TOO BIG to be built by the "do-it-yourself" addicts who put together portable aggregate plants. Unfortunately, neither the savings expected nor any of the other possible advantages are realized. The reasons are fairly obvious when you consider that it has taken a half-dozen or more manufacturing companies years of field experience, countless thousands of hours of engineering time and millions of dollars to reach the present high state of development. Today, single portable crushing and screening plants will produce 600 tons or more per hour of aggregate that will meet the toughest specifications.

Here are the experiences one producer encountered in building a "homemade" plant of which he was very proud. It's natural to be proud of one's own handiwork and one's skill in putting such a plant together. But too often pride in one's "brain child" or a false value of economy may blind a producer to facts that are obvious to any qualified aggregate equipment engineer.

It took this producer about a year and a half to get all the bugs out of his do-it-yourself plant. After that period of time, which should be called "profitless," he had a plant which would produce only 150 tph., but had the high degree of portability which was his major objective. Cost of the

*Vice President, Engineering, Iowa Manufacturing Co.

plant was estimated at $50,000. The estimate included the actual cost of building the plant and working out the bugs. It did not include the possibility of high maintenance costs due to non-expert engineering.

Manufacturers produce plants that fully equal or exceed the degree of portability achieved by the do-it-yourself builder. From a profit standpoint, this producer could have purchased for practically the same amount of money an already-engineered portable plant which would have started producing at full capacity immediately after it was delivered. In the 1½ years it took to get the bugs out of his homemade plant, production and profit were undoubtedly meager. In the same period of time, any factory-built plant could have been moved dozens of times, and between moves it would have produced the thousands of tons of aggregate a producer needs to show a profit.

There are available lightweight tandem crushing and screening plants. One is conservatively rated at a capacity of 60 to 90 tph., producing minus 1 in. with 25 percent crushing. It often produces over 125 tph. under the same conditions.

Another, a larger plant, is rated at 150 to 200 tph., but more often produces from 250 to 300 tph. Field reports show that it has produced over 400 tph. in many conditions. This is a much heavier tandem plant but, unless the power plant has to be removed to meet highway load limits, it is almost equally as portable. And because of its much greater production, it outsells the smaller one.

Now let us consider the down-to-earth economics of a do-it-yourself plant. If the producer had put his money into a plant rated at 150 to 200 tph., he could have produced close to a half-million tons of specification aggregate while he was experimenting with his own homemade machine. The production for that year and a half would have paid off his investment and left money in the bank. And he would own a plant whose upkeep and operating costs are low.

From the point of view of an engineer, it's surprising that this producer took no longer than a year and a half to get all the bugs out of his plant. A portable aggregate plant is more than simply mounting crushers, screens and conveyors on a trailer frame. These are problems of rigidity, precise alignment, unbalanced live loads, induced vibration, proper drives and matching component capacities. Weight distribution, compactness and keeping plants "legal" as to weight, width and length for easy transporting are among the variables that have to be considered.

Other do-it-yourselfers have installed cones, gyratories and jaw crushers in combination with

*Please turn page*

SERVICE ON PARTS AND REPAIR from the manufacturer is usually quick and reliable

a vibrating screen on a homemade frame. Engineers with extensive field experience know that the rotary motion of a cone or gyratory crusher in combination with the lateral vibration of a screen that is not properly mounted will set up terrific stresses. Unless each part of the plant is properly engineered, these forces throw screens out of balance, produce costly wear on shafts and bearings, cause conveyors to get out of alignment. This results in early fatigue of the truck frame, inefficient operation and increased maintenance on the whole plant. In fact, most manufacturers of aggregate components refuse warranty on their equipment unless it is properly mounted.

**Here is a good example** of making a tremendous profit on saved down-time. It is reasonable to expect that a factory-made portable plant can save an hour a day down-time. Assume that 250 days a year is a good operating year—this means 250 hours of production saved from down-time and, say at 200 tons of crushed stone per hour, we would have produced 50,000 tons of aggregate. Using a round figure of $1 per ton selling price, we have $50,000 a year. In 5 years this would pyramid into $250,000 or a quarter of a million dollars.

Improvements and better designs are constantly being made, just like in our automobiles and aircraft. So when a producer stops to figure that he can save 5 or 10 thousand dollars by doing it himself, he can easily lose this in one week's production —2,000 tons of crushed stone a day for 5 days counts up to 10,000 tons, and at simply $1 a ton this runs into $10,000. That can happen several times a year, too.

The manufacturer is eager to listen to new ideas, and he will build portable plants to suit special requirements. A complete set of drawings will be made and permanent records kept for future use whenever spare or replacement parts are needed or modifications required to do a different sort of job.

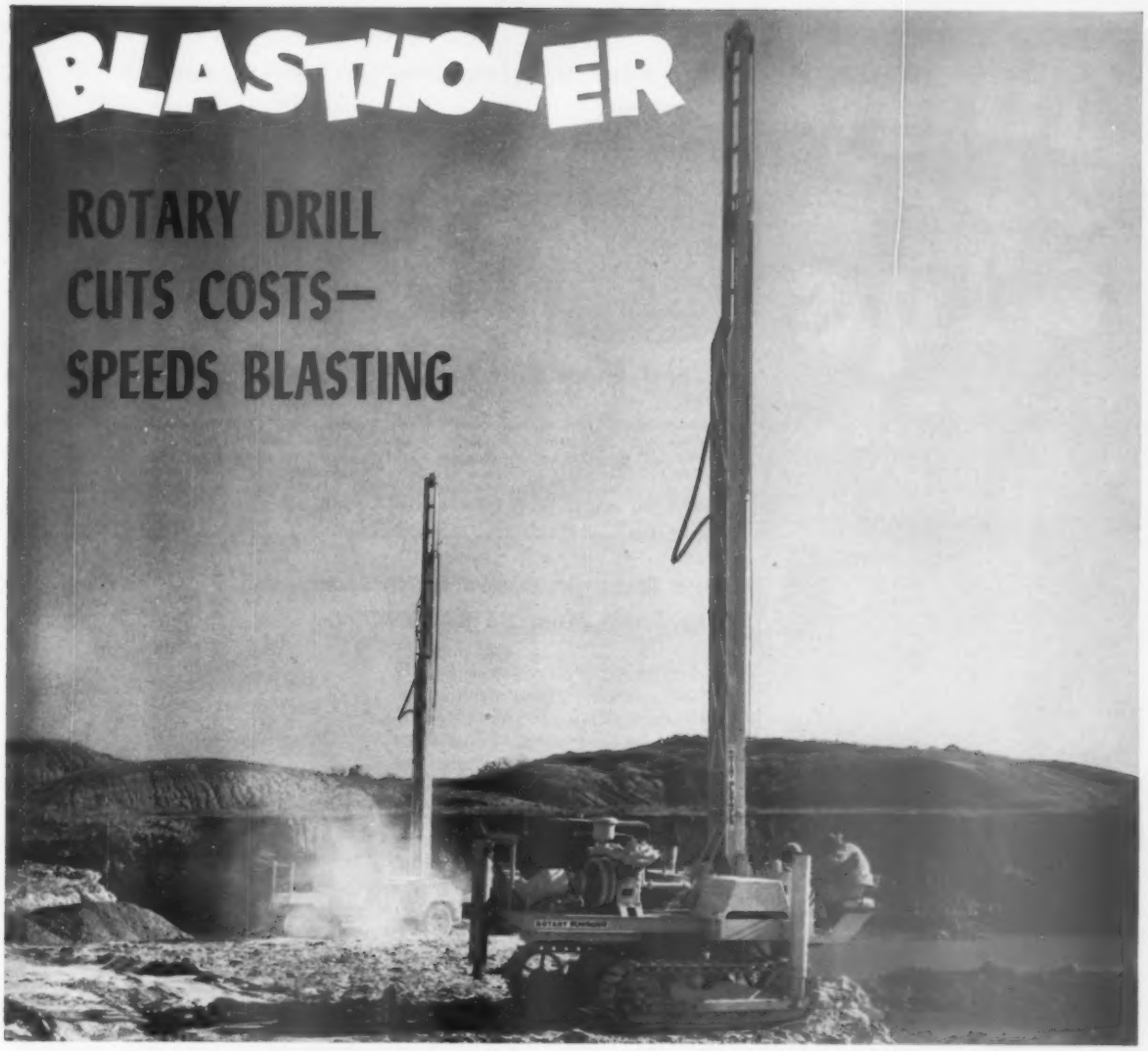
**Parts and service availability is another problem** that the owner must face. There are certain parts in any component which are expected to wear, and equipment manufacturers make certain that adequate stocks of these replacement parts are readily available. However, improper mounting of components may cause the breakdown of other parts which are not so readily available, because in normal operation a factory-built plant would have little need for them. This results in production delays while parts are shipped out from the factory.

Aside from the major components, any portable plant has many other parts, such as drives, idler rolls, controls, guards, belts, clutches and pulleys which the manufacturer and his dealers carry in stock and are readily available to owners of factory-built plants. The owner of a homemade plant, however, will often find it difficult to secure such parts as the dealer may not have in his stock any part that will fit. Dealers are understandably reluctant to risk their reputation for dependable and expert service when they are unable to supply anything but "might-fit" parts. The alternative for the plant owner is to hunt around until he finds a part that will fit, or make it himself (complete with bugs) when he has a breakdown.

When the owner of a standard manufactured portable plant needs service, he knows he can get it from his factory-trained dealer personnel or from the manufacturer's engineers. But where does the operator of a do-it-yourself plant turn for help? There is no serviceman trained to work on any part of the plant other than the standard components made by his own company. Their malfunction may be caused by mounting or drive problems which are not directly related to the efficient operation of the component itself. Furthermore, there is no service manual or parts books to go with the homemade plant such as the ones all manufacturers furnish their customers.

**Finally, most manufactured portable aggregate plants are versatile**—designed to handle a wide range of materials for many types of jobs. This allows the owner to move it about from one county or state to another as his jobs change—that is the reason for portable plants. Do-it-yourself plants often lack this versatility because the builder's field experience is limited to one area. Manufacturer-designed and manufacturer-built plants are backed up by the field knowledge gained in worldwide experience.

Aggregate producers are better off to stick to producing aggregate. Let professionals design and engineer the equipment they need. Whoever hears of a producer building his own automobile, truck, tractor or power shovel in his own shop now? It is just as impractical and expensive in the long run to build a portable aggregate plant, now that there are well over a hundred different models and makes on the market with all the engineering, manufacturing and servicing problems worked out by experts. END

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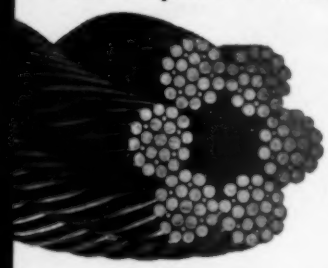
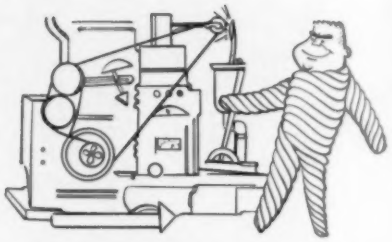
# Tuffy® Wire Rope Tips

To Get The Most for What You Pay
Be Sure You Get Correct Rope Lay

## Wire Rope is a "Machine" of Moving Parts





## ...and Every Part Must Fight Destructive Forces

A "look inside" a piece of wire rope reveals a precision-designed assembly of working parts. The parts are core, wire and strand. They are subjected not only to external and internal stresses and strains, but also to heavy surface pressures and abrasions. All these forces may be sustained while the rope is running under very high speeds, and abruptly changing direction of motion. That's why different uses require different constructions of wire rope.

**Tuffy Balanced Dragline Rope**

Here's highest abrasive resistance with super flexibility. Better spooling. Smoother riding on grooves. And Tuffy Dragline Rope hugs the drum when casting for full load. Gives you longer service life, consistent dependability, in handling any material — wet or dry dirt, sand, gravel, rock, cement or minerals.

## Extra Strength Alone is Not Enough... Wire Rope Must Be BALANCED

Sometimes extra strength is heavily stressed in advertising wire rope. While strength is important wherever wire rope is used, it is not the only important property. And there are cases where too much strength is a liability.

For example, manufacturers of scrapers have designed their equipment to take certain loads. These loads are controlled by, or subject to the ultimate strength of the rope. Larger ropes with higher strength do not break, but *the equipment itself begins to break up.*

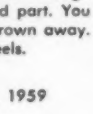
Depending on your use of wire rope, the "job prescribed" Tuffy Special Purpose Ropes give you the RIGHT BALANCE of strength, toughness, flexibility for greatest efficiency and longest service life.

**Tuffy Balanced Slings & Hoist Lines**

"Balanced" because they combine strength, flexibility and toughness in the proper relationship to do a better job longer.

Tuffy Slings and Hoist Lines are a top-performing team in every type of materials handling. The slings are made of a patented, machine-braided fabric that's next to impossible to knot or kink. The hoist lines are a special construction in which strength, flexibility and toughness are balanced.

**Tuffy Balanced Dozer Rope**

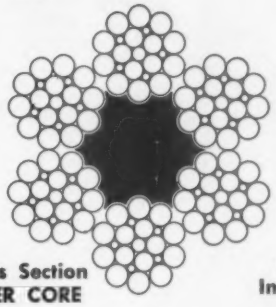


Built to give you longer service with less downtime. Mounted on your dozer, a 150' reel of ½" or 9/16" can give you a big bonus of extra service. Here's how: when rope shows drum wear or is crushed on the drum, you feed through just enough to replace the damaged part. You save the 40 to 50 feet ordinarily thrown away. Also available in 300' and 500' reels.

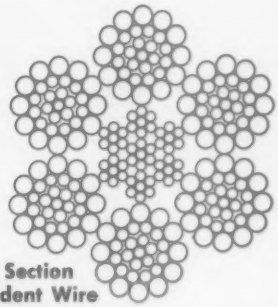
**Tuffy Balanced Scraper Rope**

"Balanced" construction makes it flexible enough to withstand sharp bends, yet stiff enough to resist looping and kinking when slack. Also gives higher resistance to the shock of load impact on slack line. Moves more yardage per foot because it's specially built to take the beating of drum-crushing abuse.

## Let's Take A Look at the CORE of Wire Rope



Cross Section
FIBER CORE

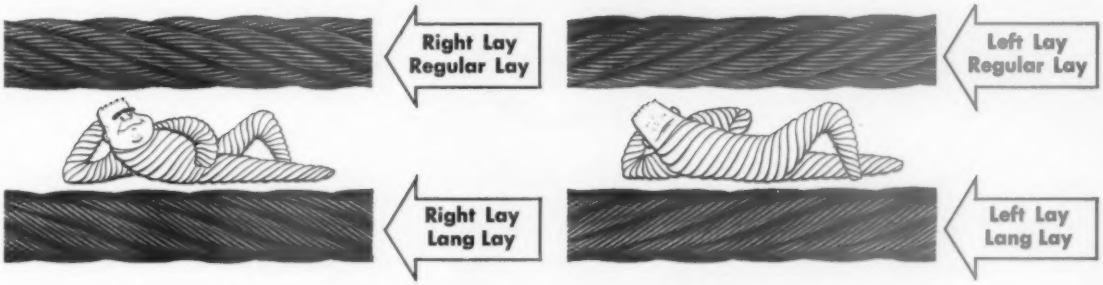


Cross Section
Independent Wire
ROPE CORE

It's either fiber or steel. Fiber cores are usually made from sisal, java, manila or combination of such hard fibers. Steel cores are either wire strand or an independent wire rope core, which amounts to a separate wire rope. The core serves as a base for the strands, keeping the rope in round shape and providing clearance between the strands for freedom of movement.

It's easy to see why wire rope is a "machine"—deserving the same care in selection and use that is given to any fine machine.

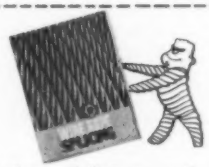
## Which Lay of Wire Rope is Right for What Use




The "lay" of a rope is described in directional terms. It's a **right lay** when the strands pass from left to right across the rope. It's **left lay** when they pass from right to left.

Wire rope is also either **regular** or **lang lay**. In the **regular lay** the wires are laid in strands opposite in direction to the lay of the strands. In the **lang lay** rope, the wires are laid in the strands in the same direction as the lay of the strands.

Most wire rope is regular lay. It has the greatest stability under the widest range of uses. On the other hand, lang lay is used in applications where greater flexibility and longer wearing services are needed.

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4

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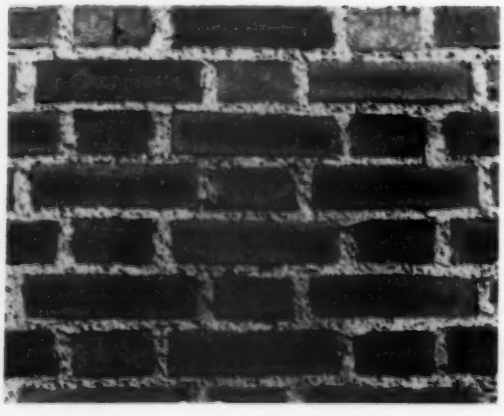
ABOVE: Close-up of 300-year-old mortar in brickwork of the old church tower at Jamestown, Va. (center)

BELOW: Close-up of modern mortar



# Sand takes on new importance

by Clyde C. Connor*

**SAND IS NO LONGER JUST SAND.** Its varying characteristics exert an unexpectedly powerful influence on the products made from it, including masonry mortar and cement mortar. Sands with identical size gradings have been found to produce differing compressive strengths, volume changes and durability in mortars. Sands with different natural gradings have caused workability of cement-lime mortars to vary from excellent to very poor.

Until the recently published research, no one has fully appreciated the extent of these effects. It has been determined that the variations are large enough to materially influence the design of concrete mixes and of masonry construction.

**What sand characteristics cause these variations?** Research so far indicates that far more must be learned about the influence of voids, porosity and pore size. Fractional grading of sands also requires further investigation. This is a concept in which I have been interested for several years, and which has proven its value in field tests. An open break with the present day practice of judging sands by their fineness modulus and by the percentages of sand particles passing each individual sieve in the sieve test, it now needs laboratory checking and development. (See "Some Effects of the Grading of Sand on Masonry Mor-

*Please turn to page 130*

*Consulting Engineer, 88 Hillside Ave., Verona, N. J.

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1. Inlet for dust-laden flue gas.
2. Dust Shave-off port.
3. By-pass dust channel.
4. By-pass re-entry opening.
5. Dust outlet.
6. Clean flue gas outlet.

EXPERTS AT DELIVERING EXTRA EFFICIENCY IN DUST RECOVERY SYSTEMS • Cyclones • "SF" Electric Precipitators • Combination Systems • Dry Classification Systems

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tars," Proceedings, Am. Soc. Testing Mats., Vol. 53, 1953.)

The standards and specifications for good sands will have to be extensively revised. This will bring new problems for the sand producer, cement manufacturer and architect, but proper protection of the interests of the consumer requires it.

Evidence of the inadequacy of our present sand selection methods have been brought out in other studies besides my own. Mr. J. G. Dempsey's research on cement mortars with different sands furnished much of the new knowledge. Some 30 sands with differing surface characteristics and particle shapes, but regraded to identical gradings, were added to identical cement pastes. The sands were added in the amounts required to produce approximately equal flows on the flow table. The effects on mortar properties were reported at the 1958 annual meeting of the American Society for Testing Materials, "The Effect of Fine Aggregate Characteristics other than Grading on Strength and Durability of Portland-Cement Mortar" (Proceedings, Am. Soc. Testing Mats., Vol. 58, 1958.)

The use of different sands produced mortars that ranged in compressive strength from 3,680 to 5,930 psi.; caused total volume change to vary from .067 to .177 of 1 percent; affected the sand carrying capacity of the paste so that it ranged from 2.21 parts up to 3.58 parts by weight, and on an arbitrary scale, produced a variation in durability under exposure to freezing and thawing from 46 (very poor) to 153 (excellent).

These are startling variations. Even after throwing out the extreme measurements that might be possible exceptions, they are equal to a bag or more of cement per cubic yard of concrete in compressive strength, and to at least a 10-percent loss in the yield of concrete per bag of cement. Initial cost would be affected substantially. Of more importance are the variations of a half inch or more per hundred feet in volume change and the great range in durability. These factors greatly influence the life of a structure and its maintenance costs.

It is not clear just what characteristics of sand caused most of the variations found in cement mortar properties. There is no escaping the conclusion, however, that they were caused by differences in sand other than grading.

**There seems little doubt that roughness** of surface, broken and sharp edges and a low proportion of equant-shaped particles were important factors in reducing the sand-carrying capacity of the cement paste, as I pointed out in my discussion of Mr. Dempsey's paper at the same ASTM meeting. There was some evidence that the same factors might have affected durability, but the indications were not consistent.

The causes for the variations in compressive strength, durability and volume change are still pretty much of a mystery. There were no consistent indications that surface characteristics or particle shapes exerted a controlling influence. The information regarding geological origin was limited, but such differences did not seem to furnish a probable explanation. It appeared that some hidden or unconsidered factors were involved.

It has long been suspected that the volume of voids in the sand affects mortar properties in a rather important fashion. This may have been one of the unconsidered factors. Neither the voids nor the volumes of sand were reported in the paper. The parts of sand were reported by weight. Parts by volume would be considerably different, and this may have had an effect. Information on both voids and volumes can be developed and may be forthcoming.

The sands studied by Mr. Dempsey had identical gradings; my study was on sands of different gradings to determine their effect on mortar workability and amount of mortar joint cracking. All the mortars, except one, contained equal parts of cement and lime, most of the limes were Type S hydrates. There were 22 sands.

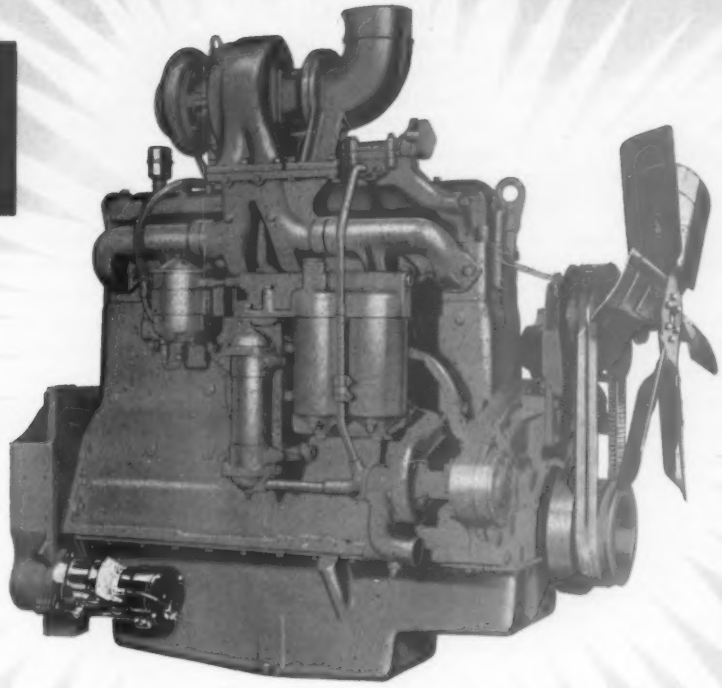
Under comparable conditions favorable to bond, the amount of mortar joint cracking with sands that produced good workability in mortar was less than half of that associated with the sands that gave poor workability. There was one important exception. Sands that produced excellent workability but contained more than 25 percent passing the No. 50 sieve caused severe joint cracking, apparently because those mortars had excessive volume change.

**Workability of mortars with cement-lime pastes** was largely determined by the relationship of the fractional amounts of the sand between sieves in the sieve analysis. So important was this influence that different fractional gradings made the workability vary from excellent to very poor, in spite of the influence of the highly plastic pastes. The workability of the mortar could be estimated closely from the fractional grading of the sand.

The basic theory of fractional grading is that the particles in the coarsest fraction are wedged

*Please turn to page 132*

# Most economical diesel of its kind



The new Allis-Chalmers 21000 saves up to 3 gallons of fuel in every 10, compared with other diesels.

# ...has stamina to match

Here's the heavy-duty engine that was tested under full load with half the connecting rod and main bearings cut away. It was deliberately run hot and with only partial lubrication. It was operated with intentionally weakened parts and with imbalances. Its stamina was tested far beyond toughest field use to prove that its great economy was more than matched with ability to take it. Hundreds of field reports show the difference between this great engine and ordinary diesels!

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apart by those in the next finer fraction and these, in turn, are wedged apart and surrounded by the particles in the succeeding finer fraction. This requires that the fractions increase by liberal amounts from coarse to fine, but field results show that the progressive increase should stop with the No. 30 to No. 50 sieve fraction. Mixed in mortar, the fractions form a roller bearing system which prevents the coarser particles from clashing and interfering with easy trowelability.

My study was made on pit sands only, none of them rough. Manufactured sands might require a different grading. Mr. Dempsey's work indicates that workability would be increased by smooth, rounded particles and a large percentage of equant shapes. The results of the two studies appear to be transferable. It is reasonably certain that the effects of the characteristics of sand on cement mortar also apply to masonry mortar. The fractional grading of sand probably affects cement mortar in much the same fashion as it does masonry mortar. Cement mortar is the major component of concrete, and its properties largely determine the properties of the concrete. Some authorities claim that, within practical limits, the mortar properties dominate almost completely.

**Observation of fractional grading** of masonry sands has been made for years in building construction, and excellent results are leading to its growing use as a measure of suitability of sands. An adaptation to the coarser concrete sands has been used with considerable benefit. Fractional grading requirements heretofore had applied only to asphalt sands.

Present practice is to judge the suitability of a sand or fine aggregate by its fineness modulus and by the percentages of sand particles passing each individual sieve in the sieve test.

The present ASTM sieve analysis requirements do not provide for the progressively increasing fractions needed to obtain a roller bearing effect. In my study I found that four of the sands which had proved highly satisfactory in field use did not pass the ASTM requirements. More important, one of the unsatisfactory sands passed easily.

The fineness modulus has been in use for more than a quarter of a century. It is an empirical figure obtained by adding the cumulative percentages of the sand retained on each of the standard sieves from the No. 4 to No. 100. A fineness modulus between 2.5 and 3.0 is frequently specified for concrete sands, but in practice the lower limit is often violated because of the lack of available sands in the specified range. The range specified by ASTM is 2.3 to 3.1.

The range of fineness modulus for masonry sands is less well established. Something between 2.25 and 2.5 is thought to be desirable by many. However, I found that several of my most satisfactory sands were outside this range on the low side, and one unsatisfactory sand was well within. There is no direct relationship between the fineness modulus and fractional gradations.

Revision of the ASTM tentative standard specifications for concrete and masonry mortar sands will have to include consideration of pore size. Mr. T. B. Kennedy, in a thoughtful paper on the durability of concrete, designated the soundness test as one of the most controversial of all the ASTM tests for aggregates. He outlined the growing evidence of the importance of pore size on durability. (See "Laboratory Testing and the Durability of Concrete," Proceedings, Am. Soc. Testing Mats., Vol. 58, 1958.) Pore size is not considered in present ASTM specifications.

In 1954 a survey of masonry sands used in various areas of the country showed that only 33 percent passed the ASTM grading requirements. A search for an escape clause was instituted by the ASTM commitee responsible, but so far no satisfactory escape clause has been found. In the survey, more sands passed the fractional grading requirements, but the improvement was not great.

Implications of the new information regarding sand reach very far indeed. A combination of several factors is needed to produce moistureproof masonry walls, but near the top of the list is a workable mortar. Workability can be reduced in many ways, but apparently it cannot be obtained in mortars without a sand having the proper fractional grading. The common causes for building leaks being known, there is no longer a good excuse for masonry buildings to leak during every severe storm. When owners and builders recognize that a properly graded sand is one of the basic requirements for moistureproof walls, there is going to be a new and critical interest in sand.

Some may argue that knowledge concerning the effects of sand is useless because the available sand has to be used anyway. This is considerably less than a half truth. In many parts of the country there is a choice of sands, some good and some definitely poor. A good sand can be selected only if the proper requirements are known. A complete revision of specifications may take years, but changes need to be made as soon as possible to incorporate what is known. END

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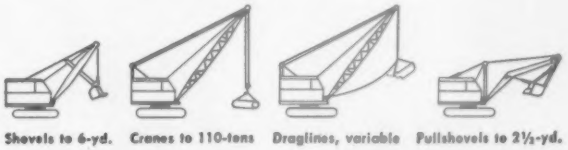

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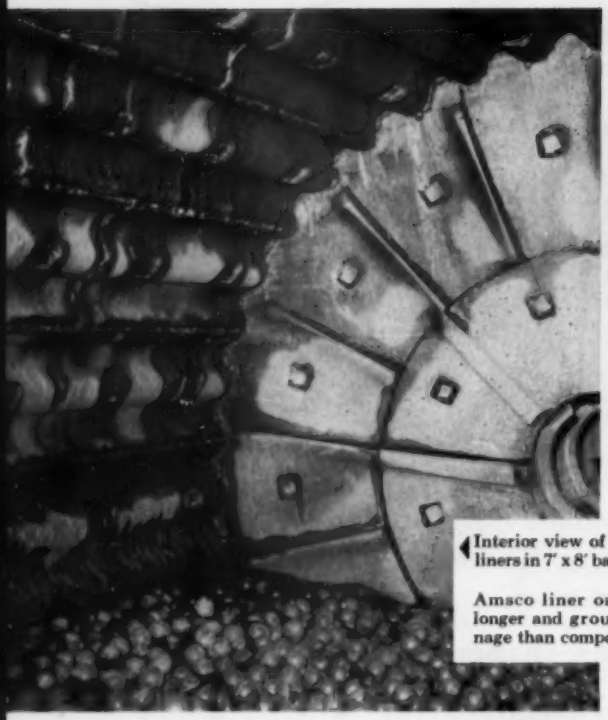

Interior view of Amsco double wave liners in 7' x 8' ball mill, using 2" balls.

Amsco liner on left lasted 123% longer and ground 134% more tonnage than competitive liner on right.

Bucyrus 88 D four-yard bucket, equipped with Amsco Simplex 2-part Teeth, removing rock for power station. All of Tuscarora Constructors' shovels used for rock excavation are equipped with Amsco Simplex Teeth.

# MORE TONS PER DOLLAR

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Amsco double wave chrome-moly liners are used on an Allis-Chalmers 7′ x 8′ ball mill at this large northern New York zinc mine. The mill is operating *24 hours a day, six days a week*... grinding rod mill discharge consisting of sphalerite, pyrite and the balance silicate and limestone gangue.

These Amsco liners ground 670,000 tons during their 29-month life... as against an average of 286,000 tons and 13-month life for the type of liners previously used. That adds up to over *100% increase in service life.* In addition to their longer life, another fact that impresses the operators about Amsco liners is that there's no circumferential grooving until the very end of their service life.

TUSCARORA CONSTRUCTORS HAVE FOUND...

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Dell Lundmark, Equipment Superintendent for Tuscarora, was responsible for selecting Amsco 2-part reversible teeth for his dippers. He'd heard of their fine performance elsewhere, and now describes them as the "best wearing teeth we've ever used". He says the design of the teeth is very good for rock, and adds, "We're getting *15% to 20% longer wear* than from competitive 2-part teeth".

Approximately 10,000 tons of rock are handled before the teeth are turned over ... and tips are easy to replace when completely worn.

This combination of a new alloy steel, plus the design features engineered into the Amsco Simplex Teeth, are causing equipment superintendents everywhere to change to Amsco for better, lower cost digging.

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PLANNING FOR RESEARCH is important to NCSA. A corner-table conference includes (left to right) A. T. Goldbeck, engineering consultant; W. C. Rowe, president; G. D. Lott, Jr., vice president, and J. E. Gray, engineering director

# NCSA REVIEWS PROGRESS, TALKS NEW GOALS

THE NATIONAL CRUSHED STONE ASSOCIATION has proved to be a good planner. A review of the last couple of years' work shows that association expansion plans set forth in 1957 hit the nail pretty much on the head as far as industry needs are concerned. The program for expanded services to members and to the industry was well conceived and has been well executed.

The NCSA Board of Directors met the latter part of July at the Homestead, Hot Springs, Va., to discuss past performance and future plans. Association officers, committee chairmen and the Washington staff reported that (1) acceptance of the Accounting Manual, recently published by NCSA, has been more than satisfactory, (2) the increased activity, re legislative matters, has been helpful to members and industry, and (3) the expanded engineering services have been beneficial.

Looking ahead, the group moved closer to solidifying plans for the up-coming Annual Convention

*Please turn page*

MANUFACTURERS DIVISION executive committee meeting drew all members; three past chairmen also were present. From left to right: Wayne W. King, W. S. Tyler Co.; W. C. Rowe, NCSA president, Rowe Contracting Co.; I. F. Deister, Deister Machine Co.; F. A. Pampel, Chain Belt Co.; J. R. Boyd, NCSA executive director; J. Craig McLanahan, McLanahan & Stone Corp.; L. A. Eiben, Northern Blower Co.; W. E. Collins, Division chairman, Atlas Powder Co.; B. R. Maloney, E. I. duPont deNemours & Co.; George D. Fraunfelder, Easton Car & Construction Co., and J. M. Hume, Pettibone Mulliken Corp.

## NCSA REVIEWS PROGRESS, TALKS NEW GOALS, *continued from p. 137*

and Show in Chicago, Ill., during the week of February 21, 1960. It also took a good look at plans to increase basic industry research, which is considered necessary to keep up with growth in the use of stone in all types of construction. It is expected, at the same time, that routine testing and service testing for members will be continued to provide maximum effectiveness of service.

The meeting itself was conducted with top efficiency under the chairmanship of Warren C. Rowe, NCSA president. The Washington staff, headed by executive director J. R. Boyd, provided a streamlined agenda.

**The Federal Highway Program** was virtually stymied at the time of the meeting and came in for much discussion. Mr. Boyd explained the dilemma with respect to Interstate Funds. It was proposed that the association's individual members write their Congressmen to the effect that interim financing for the program should be made available, to keep the program going. Of course, a new bill to do just that has been made into law.

**Promotional activities of NCSA** have been showing good results. Response to promotion of the Accounting Manual for the Crushed Stone Industry has surpassed expectations. Total sales to date (at meeting time) are 68 copies to non-members and 80 copies to NCSA members—148 in all. This publication is basically important to the industry, particularly in these times of increased competition.

Two additional publications have been made available to membership. One is that containing the papers presented at the Session for Operating Men at the annual convention in January of this year; the other includes the papers delivered at the same convention, at the Session for Salesmen.

**On legislative activities,** the group approved a report of two actions taken by association counsel, to protect the interest of crushed stone producers. A statement was filed in July with the House Committee on Education and Labor. It set forth opposition to certain amendments to the Labor Management Relations Act of 1947, concerning special treatment proposed for the building and construction industry. During the same month, a letter went out to members, calling attention to a House bill that would provide for the temporary suspension of import duties on certain types of limestone. It was expected that the association would subsequently oppose enactment of this legislation.

Membership in NCSA is growing. At last count, reported at the meeting, the active membership totalled 169. Associate members of the association number 118.

**More research** by the association was given the green light. A study by the engineering director pointed up that a large amount of service testing, classed as urgent, had reduced the available time for engineering research. Actually, the NCSA laboratory does testing work of three kinds: (1) routine testing, (2) service testing and (3) research.

Included in routine testing are a few tests for acceptance, such as Los Angeles abrasion, specific gravity and soundness. There are several others, but it was estimated that routine testing that could be done in a commercial laboratory has taken up about 5 percent of the laboratory staff time the past year.

Service testing involves tests for member companies who have complex problems. It also includes the type of tests that require special equipment not normally available in a commercial laboratory. An analysis of laboratory time spent on this type of work showed that it consumed a major portion of available time. But results of such tests do, in many cases, affect the economic status of a company.

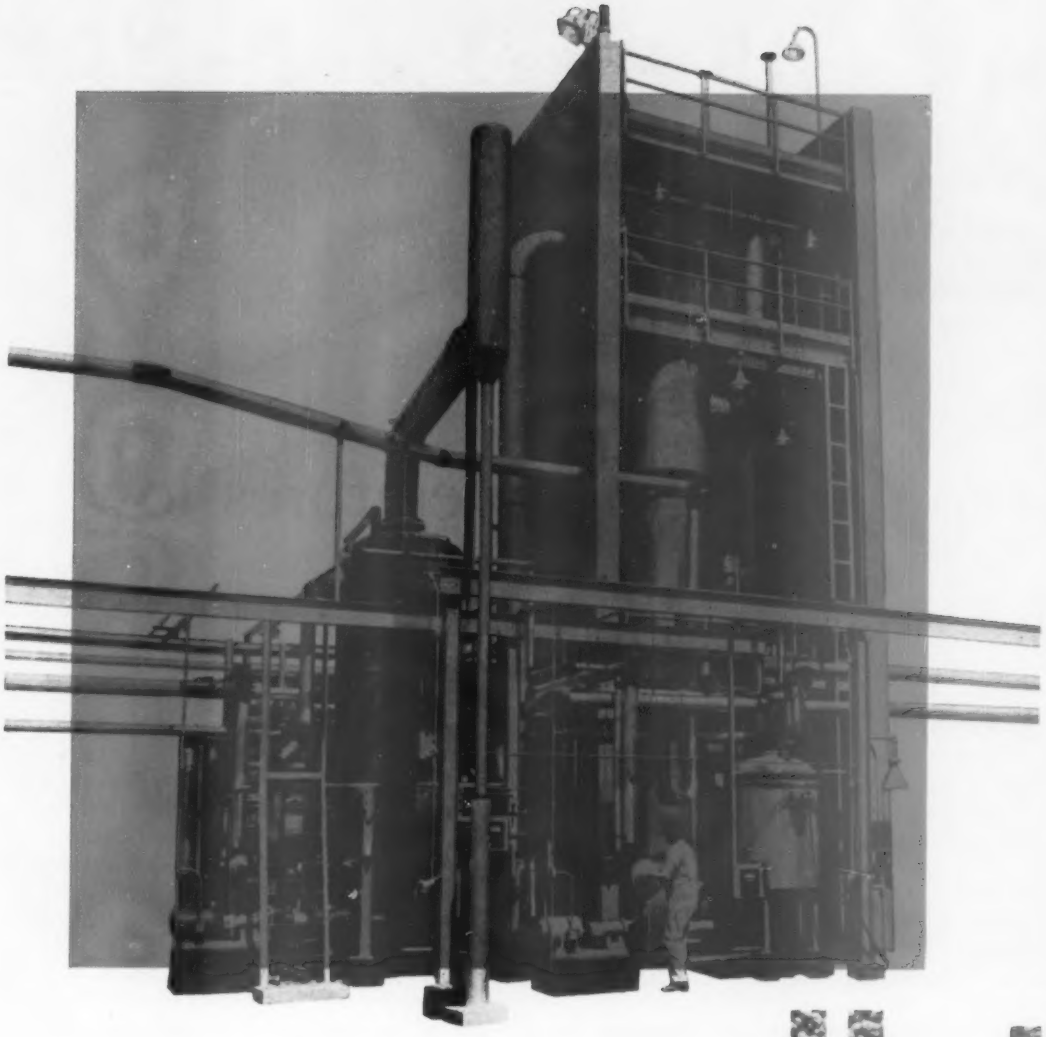
Objectives of applied research conducted by NCSA are along three lines. One is development of information on the properties of crushed stone, which could be used to improve specifications. A second is developing data that would improve methods of testing stone. Another concerns finding ways to better use crushed stone.

Recommendations to solve the problem of not enough time for applied research were accepted by the Board. They consist of dividing the laboratory work into two divisions—research and service testing—and increasing the personnel of the laboratory to assure more work of the research type.

In connection with the research problem, the association's engineering consultant, A. T. Goldbeck, called for greater attention to research as a way to new uses for stone and new products. This kind of work may begin first through combined thought by a number of individuals. Laboratory work would come later.

**The February 1960 Convention and Show** will incorporate new streamlined planning, and will provide plenty of opportunity for conventioneers to inspect the exhibits. Improvements in the planned program include (1) a new form of pre-

*Please turn to page 154*



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*High temperatures*
*make clinker harder to grind,*
*lower cement quality*

# Keep grinding temperatures low

by Kunihiro Takemoto, Iwao Ito & Kikuji Hirayama*

OPERATING BALL MILLS TO GRIND CEMENT clinker at temperatures below 105 deg. C. improves the grindability and the quality of portland cement. By grinding above this temperature, the gypsum added to cement clinker loses its effect as a grinding aid. Above this temperature, gypsum converts to hemihydrate, and the particle size distribution of cement becomes worse. The grindability of the mixture declines remarkably, and the finished cement shows false setting and lower strength.

Although it is well known that high grinding temperature reduces the grindability of cement, there has been no clear investigation on this point. It is well known that gypsum dehydrates at high temperature in grinding to cause false set of cement, but there are no reports on the other properties of the cement ground at high temperature.

**Here are the specific results of our studies** of the effects of grinding temperature on the grindability and the qualities of cement.

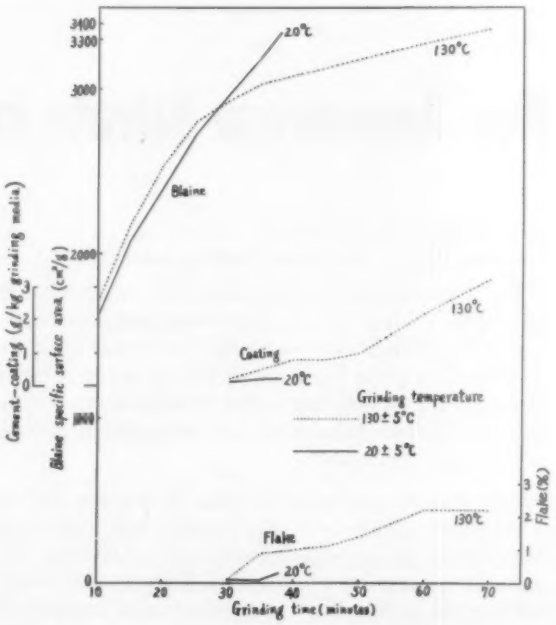
—Gypsum shows a remarkable effect as grinding aid. It seems to reduce cement coating on the grinding media, flakes in cement and the total grinding time at temperatures below 105 deg. C.

—In the grinding process with gypsum at temperatures below 105 deg. C., the value of n calculated by Rosin-Rammler's equation $\log \bar{R}(x) = -kx^n$ is constant. The finished cement contains many more medium-size particles, between 15 and 40$\mu$. It has less tendency to false set by aeration and greater mortar strength than cement ground at temperatures above 105 deg. C.

—At grinding temperature of 105 deg. C., gypsum added to clinker dehydrates to hemihydrate in the grinding process. Therefore, the cement coat-

*Please turn to page 144*

FIGURE 1. Relation between grinding time and Blaine specific surface area, flake or cement coating. Grinding conditions 17, 18 (dihydrate, cylpeb, clinker < 2.5 mm.)




*Central Research Laboratory, Onoda Cement Co., Ltd., Yamaguchi-Prefecture, Japan*

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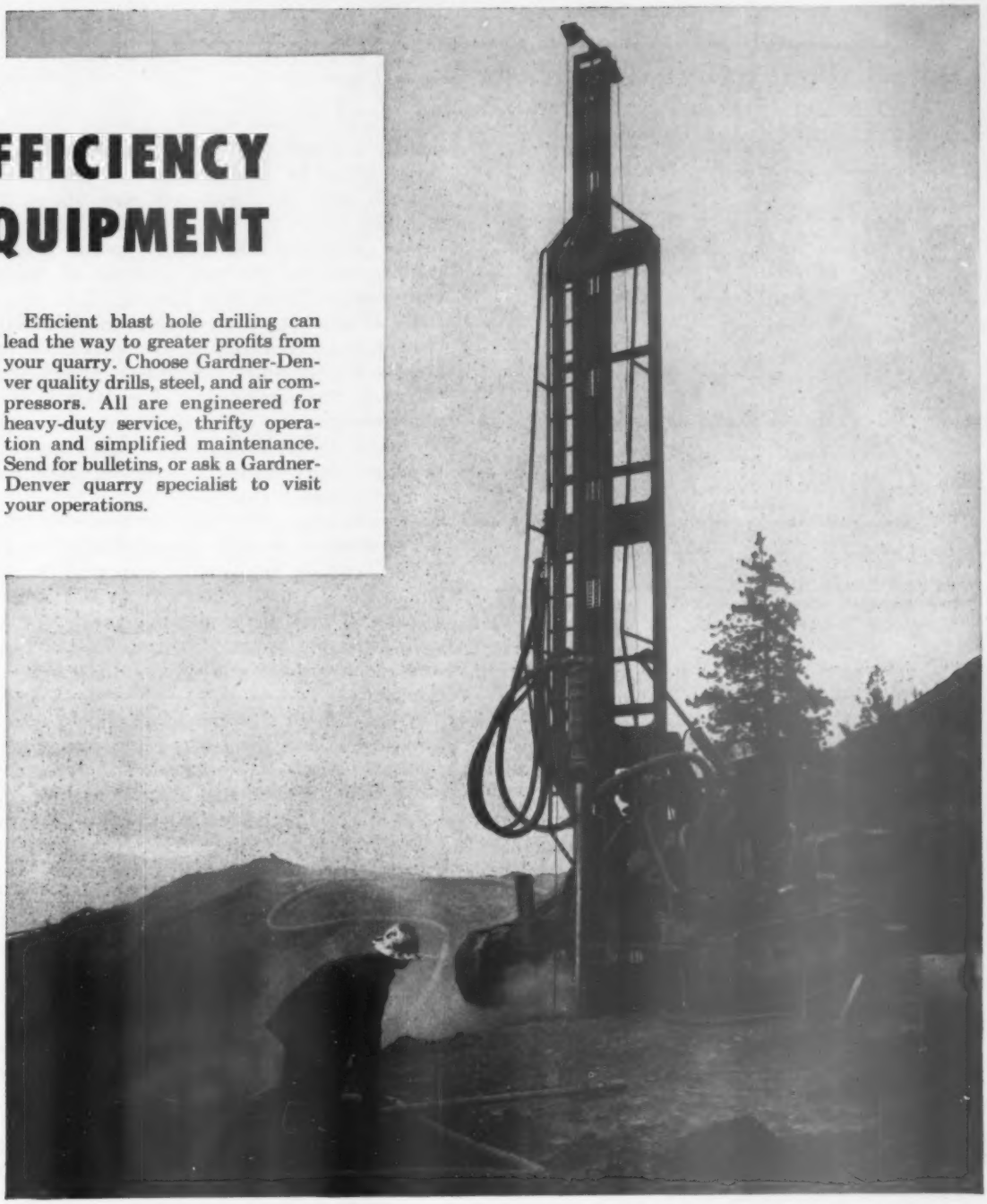

The best drill steel you can buy. Gardner-Denver carburized and shot-peened sectional rod and couplings. Hardened surface resists abrasion. Tough core provides compressive strength. Lasts longer. Cuts your steel cost per ton of rock.

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## KEEP GRINDING TEMPERATURES LOW, *continued from p. 140*

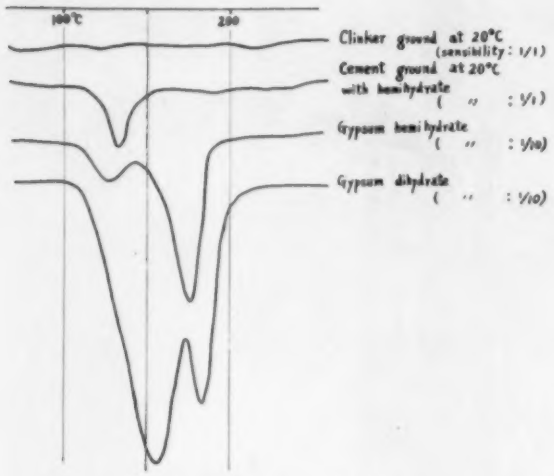
100°C
200
Clinker ground at 20°C (sensibility : 1/1)
Cement ground at 20°C with hemihydrate ( " : 1/1)
Gypsum hemihydrate ( " : 1/10)
Gypsum dihydrate ( " : 1/10)

FIGURE 2A. Differential thermal analysis curves of gypsum dihydrate, hemihydrate, cement ground with hemihydrate and ground clinker. Heating rate: 5 deg. C./min.

ing on the grinding media gradually increases in the grinding over 3,000 cm.²/g. Blaine, and the grindability of cement decreases slightly.

—At 130 or 150 deg. C., gypsum dehydrates rapidly to hemihydrate and then gradually to soluble anhydrite in the grinding process. The cement coating on the grinding media increases, the grinding becomes difficult and the value of n decreases.

—When hemihydrate is added to clinker instead of raw gypsum, more grinding time is needed and the value of n decreases with the progress of grinding at any grinding temperature between 20 and 150 deg. C. The higher the grinding temperature, the more the value of n decreases, and hemihydrate added to clinker dehydrates to soluble anhydrite at grinding temperatures above 130 deg. C. The finished cement has an intense tendency to false set by aeration and much lower strength, compared to cement ground below 105 deg. C. with raw gypsum.

—Clinker without gypsum is more difficult to grind and needs more grinding time than clinker with either dihydrate or hemihydrate. But the appearance of coating, flakes and decreasing value of n are the same as those of clinker with hemihydrate. It seems that hemihydrate scarcely has any effect as a grinding aid, and the dihydrate loses its effect by dehydration at grinding temperatures above 105 deg. C.

—Cement having unfavorable size distribution, namely low value of n, has greater tendency to false setting by aeration, even if ground at 20 deg. C. with dihydrate. It also shows lower strength.

We ground clinker with gypsum dihydrate, hemihydrate or without gypsum at temperatures ranging from 20 to 150 deg. C. At the same time, we observed the grinding time, the flake in cement, the cement coating on the grinding media and the granulometric composition of cement. The extent of the dehydration of gypsum in cement was examined by differential thermal analysis. The physical properties of the finished cement, setting time, false setting by aeration and strength of mortar were tested.

**Two kinds of coarsely ground clinker** were used in our analysis, through 2.5 mm. and through 5 mm. mesh. Natural gypsum from Mexico ground to pass .21 mm. sieve, or hemihydrate (produced by heating the ground dihydrate at 110 deg. C.) was added to clinker to give 1.3 percent $SO_3$ in cement.

A test mill 50 x 30 cm. turning at 57 rpm. was used throughout the tests. Eight Kg. of clinker preheated to about 75 deg. C. and gypsum were put in the mill, previously charged with the grinding media and preheated to a definite temperature with an electric heater. Then the cement was ground. Grinding temperature was measured with alcohol thermometer inserted about 10 cm. into cement each interval, and regulated to a definite temperature in the range plus or minus 5 deg. C. by electric heater.

At intervals of 5 or 10 min., a small amount of ground cement together with grinding media was scooped up and placed on a 5 mm. sieve. Shaking the sieve violently, cement was screened out as completely as possible. Fifty grams of screened cement was sieved with a .3 mm. sieve, and the residue of flake and grit in cement was measured.

"Flake" was defined as the residue which could pass the above sieve when rubbed with finger. The final residue on the above sieve after rubbing was regarded as "grit." The tests of Blaine specific surface area of cement and the extent of dehydration of gypsum in cement by differential thermal analysis were carried out with 15 g. of this sieved cement.

Cement coating on the grinding media was estimated from the weight of the cement rigidly adhered to a ball of each size and five cylpebs. The cement lightly coating the grinding media was re-

*Please turn page*

TABLE I—Qualities of finished cements

| Grinding condition (No.) | Blaine specific surface area ($cm^2/g$) | Residue on 88μ sieve (%) | Air elutriation >15μ (%) | Air elutriation >44μ (%) | Air elutriation 15μ<44μ (%) | Air elutriation n | Air elutriation k (×10⁻⁴ μ⁻ⁿ) | Loss (%) | False setting by JASS** W/C (%) | Initial penetration (mm) | After 5 minutes (mm) | After 10 minutes (mm) | False set | JIS R 5201 W/C (%) | Initial set (h.m.) | Final set (h.m.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3460 | 0.8 | 62.6 | 26.0 | 35.8 | 1.07 | 255 | 0.53 | 23.9 | 35 | 29 | 26 | not | 23.9 | 2 27 | 3 17 |
| 2 | 3470 | 0.7 | 63.2 | 26.6 | 36.6 | 1.10 | 237 | 0.54 | 23.6 | 33 | 6 | 6 | have | 23.6 | 2 10 | 3 03 |
| 3 | 3450 | 0.8 | 63.2 | 26.4 | 36.8 | 1.10 | 234 | 0.47 | 24.3 | 35 | 8 | 6 | have | 24.3 | 2 17 | 3 05 |
| 4 | 3460 | 0.8 | 61.8 | 27.6 | 33.4 | 1.00 | 333 | 0.45 | 23.5 | 36 | 21 | 8 | have | 23.5 | 1 57 | 2 52 |
| 5 | 3500 | 2.2 | 61.0 | 28.2 | 32.8 | 0.98 | 353 | 0.43 | 23.1 | 36 | 33 | 24 | not | 23.1 | 1 43 | 2 38 |
| 6 | 3490 | 0.3 | 64.4 | 24.4 | 40.0 | 1.20 | 168 | 0.83 | 25.8 | 35 | 31 | 33 | not | 25.8 | 2 52 | 3 42 |
| 7 | 3460 | 0.3 | 64.6 | 25.6 | 39.0 | 1.17 | 178 | 0.98 | 24.5 | 35 | 32 | 29 | not | 24.5 | 2 45 | 3 42 |
| 8 | 3460 | 0.3 | 64.4 | 24.8 | 39.6 | 1.19 | 175 | 0.56 | 25.5 | 36 | 35 | 36 | not | 25.5 | 2 26 | 3 10 |
| 9 | 3440 | 1.2 | 62.0 | 28.0 | 34.0 | 1.02 | 304 | 0.42 | 24.3 | 34 | 14 | 14 | have | 24.3 | 1 57 | 2 41 |
| 10 | 3440 | 1.4 | 62.6 | 28.8 | 33.8 | 1.02 | 295 | 0.44 | 24.0 | 36 | 12 | 16 | have | 24.0 | 1 49 | 2 34 |
| 11 | 3440 | 0.8 | 60.4 | 24.2 | 36.2 | 1.07 | 268 | 0.38 | 28.5 | 32 | 8 | 2 | have | 28.5 | 4 34 | 6 37 |
| 12 | 3430 | 2.2 | 58.8 | 24.6 | 34.2 | 1.00 | 344 | 0.40 | 26.0 | 33 | 1 | 0 | have | 26.0 | 2 40 | 3 50 |
| 13 | 3440 | 0.3 | 63.8 | 24.0 | 39.8 | 1.19 | 178 | 0.80 | 25.0 | 34 | 30 | 30 | not | 25.0 | 2 52 | 3 38 |
| 14 | 3470 | 1.1 | 62.4 | 26.0 | 34.4 | 1.03 | 288 | 0.55 | 24.2 | 35 | 16 | 12 | have | 24.2 | 1 52 | 2 36 |
| 15 | 3400 | 1.4 | 63.0 | 28.0 | 35.0 | 1.05 | 265 | 0.84 | 24.2 | 34 | 30 | 20 | not | 24.2 | 2 42 | 3 35 |
| 16 | 3440 | 2.4 | 60.0 | 27.4 | 32.6 | 0.97 | 363 | 0.52 | 23.7 | 36 | 16 | 4 | have | 23.7 | 1 29 | 1 56 |
| 17 | 3430 | 0.3 | 62.6 | 21.2 | 41.4 | 1.24 | 166 | 0.82 | 26.3 | 34 | 33 | 30 | not | 26.3 | 2 15 | 3 13 |
| 18 | 3420 | 1.0 | 63.2 | 25.8 | 37.4 | 1.12 | 214 | 0.52 | 24.2 | 22 | 12 | 12 | have | 24.2 | 1 38 | 2 21 |

| Grinding condition (No.) | Mortar strength (JIS) W/C (%) | Flow (mm) | Weight (g) | Bend. strength (kg/cm²) 3d | 7d | 28d | Comp. strength (kg/cm²) 3d | 7d | 28d | 30 minutes aeration* Loss (%) | False setting by JASS** W/C (%) | Initial penetration (mm) | After 5 minutes (mm) | After 10 minutes (mm) | False set | JIS R 5201 W/C (%) | Initial set (h.m.) | Final set (h.m.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 65 | 273 | 549 | 39.9 | 61.0 | 77.2 | 178 | 313 | 491 | 0.57 | 25.0 | 35 | 18 | 9 | have | 25.0 | 3 00 | 3 45 |
| 2 | " | 267 | 546 | 35.8 | 52.2 | 80.6 | 152 | 281 | 456 | 0.53 | 24.4 | 37 | 2 | 3 | have | 24.4 | 2 38 | 3 28 |
| 3 | " | 262 | 545 | 35.8 | 64.4 | 80.6 | 161 | 305 | 478 | 0.64 | 23.8 | 35 | 2 | 1 | have | 23.8 | 2 39 | 3 31 |
| 4 | " | 265 | 542 | 33.0 | 54.2 | 77.3 | 153 | 287 | 437 | 0.48 | 24.0 | 38 | 32 | 25 | not | 24.0 | 2 35 | 3 23 |
| 5 | " | 263 | 542 | 37.3 | 56.1 | 74.8 | 164 | 291 | 436 | 0.48 | 23.8 | 37 | 35 | 30 | not | 23.8 | 2 35 | 3 30 |
| 6 | " | 261 | 551 | 42.0 | 64.1 | 81.2 | 172 | 326 | 478 | 0.90 | 25.8 | 34 | 20 | 12 | have | 25.8 | 3 33 | 4 18 |
| 7 | " | 270 | 551 | 41.4 | 65.3 | 87.6 | 183 | 329 | 469 | 0.79 | 24.7 | 35 | 32 | 28 | not | 24.7 | 3 35 | 4 30 |
| 8 | " | 259 | 549 | 40.7 | 64.3 | 81.6 | 181 | 316 | 481 | 0.67 | 25.8 | 4 | 3 | 2 | have | 25.8 | 2 23 | 4 20 |
| 9 | " | 267 | 545 | 38.6 | 56.4 | 75.5 | 161 | 283 | 431 | 0.55 | 24.5 | 32 | 7 | 6 | have | 24.5 | 3 09 | 3 57 |
| 10 | " | 265 | 542 | 34.4 | 53.7 | 77.9 | 162 | 296 | 406 | 0.49 | 24.9 | 11 | 3 | 2 | have | 24.5 | 2 40 | 3 28 |
| 11 | - | - | - | - | - | - | - | - | - | 0.45 | 28.3 | 33 | 2 | 1 | have | 28.3 | 3 40 | 6 00 |
| 12 | - | - | - | - | - | - | - | - | - | 0.45 | 26.3 | 33 | 1 | 1 | have | 26.3 | 2 28 | 3 35 |
| 13 | 65 | 271 | 552 | 41.1 | 64.8 | 78.2 | 182 | 325 | 493 | 0.90 | 27.0 | 34 | 31 | 29 | not | 27.0 | 2 37 | 3 49 |
| 14 | " | 269 | 546 | 39.8 | 56.2 | 72.6 | 168 | 278 | 450 | 0.63 | 24.5 | 36 | 6 | 5 | have | 24.5 | 2 24 | 3 20 |
| 15 | " | 256 | 547 | 37.0 | 57.9 | 74.8 | 174 | 304 | 449 | 0.90 | 24.7 | 35 | 34 | 30 | not | 24.7 | 3 24 | 4 16 |
| 16 | " | 258 | 542 | 34.0 | 49.9 | 70.0 | 157 | 261 | 414 | 0.54 | 24.0 | 36 | 14 | 5 | have | 24.0 | 1 46 | 2 24 |
| 17 | " | 272 | 550 | 45.1 | 66.6 | 80.3 | 179 | 318 | 484 | 0.92 | 26.0 | 34 | 31 | 28 | not | 26.0 | 2 45 | 3 50 |
| 18 | " | 281 | 550 | 40.9 | 58.0 | 74.5 | 164 | 280 | 468 | 0.57 | 24.5 | 34 | 2 | 1 | have | 24.5 | 2 15 | 2 55 |

| Grinding Condition (No.) | 5 hours aeration* Loss (%) | False setting by JASS** W/C (%) | Initial penetration (mm) | After 5 minutes (mm) | After 10 minutes (mm) | False set | JIS R 5201 W/C (%) | Initial set (h.m.) | Final set (h.m.) | 15 hours aeration* Loss (%) | False setting by JASS** W/C (%) | Initial penetration (mm) | After 5 minutes (mm) | After 10 minutes (mm) | False set | JIS R 5201 W/C (%) | Initial set (h.m.) | Final set (h.m.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.80 | 24.5 | 34 | 1 | 1 | have | 24.5 | 3 52 | - | 1.13 | 24.2 | 35 | 25 | 15 | have | 24.2 | 4 27 | 5 37 |
| 2 | 0.78 | 24.8 | 34 | 2 | 2 | have | 24.8 | 3 45 | - | 1.27 | 25.0 | 34 | 6 | 5 | have | 25.0 | 4 15 | 5 23 |
| 3 | 0.78 | 25.0 | 15 | 1 | 1 | have | 25.0 | 3 44 | - | 1.06 | 25.0 | 34 | 2 | 1 | have | 25.0 | 4 58 | 6 30 |
| 4 | 0.74 | 24.3 | 34 | 1 | 1 | have | 24.3 | 3 41 | - | 1.31 | 24.3 | 35 | 1 | 1 | have | 24.3 | 4 44 | 5 50 |
| 5 | 0.70 | 23.9 | 34 | 1 | 1 | have | 23.9 | 3 35 | - | 1.28 | 24.0 | 37 | 1 | 1 | have | 24.0 | 3 49 | 5 45 |
| 6 | 1.20 | 27.0 | 35 | 28 | 32 | not | 27.0 | 4 36 | - | 1.76 | 27.8 | 36 | 30 | 18 | not | 27.8 | 5 16 | 6 34 |
| 7 | 0.97 | 25.8 | 34 | 6 | 5 | have | 25.8 | 3 52 | - | 1.62 | 26.5 | 36 | 31 | 23 | not | 26.5 | 4 25 | 5 42 |
| 8 | 0.84 | 26.8 | 7 | 3 | 4 | have | 26.8 | 4 57 | - | 1.27 | 25.0 | 35 | 27 | 15 | have | 25.0 | 5 14 | 6 22 |
| 9 | 0.68 | 26.0 | 8 | 4 | 5 | have | 26.0 | 4 43 | - | 1.06 | 24.2 | 34 | 1 | 1 | have | 24.2 | 5 53 | 6 38 |
| 10 | 0.70 | 25.5 | 9 | 4 | 4 | have | 25.5 | 4 38 | - | 1.07 | 24.5 | 34 | 0 | 0 | have | 24.5 | 5 52 | 6 48 |
| 11 | 0.71 | 29.5 | 38 | 17 | 9 | have | 29.5 | 2 45 | - | 1.40 | 29.5 | 8 | 3 | 2 | have | 29.5 | 5 35 | 7 10 |
| 12 | 0.87 | 28.0 | 35 | 0 | 0 | have | 28.0 | 2 24 | 3 43 | 1.32 | 27.8 | 30 | 3 | 2 | have | 27.8 | 3 00 | 4 30 |
| 13 | 1.11 | 26.3 | 33 | 15 | 14 | have | 26.3 | 1st 4 05 / 2nd 6 55 | - | 1.78 | 26.0 | 35 | 29 | 24 | not | 26.0 | 4 16 | 5 36 |
| 14 | 0.80 | 24.5 | 6 | 0 | 0 | have | 24.5 | 1st 3 17 / 2nd 5 40 | - | 1.08 | 25.0 | 34 | 1 | 0 | have | 25.0 | 3 43 | 4 53 |
| 15 | 1.09 | 25.3 | 34 | 11 | 7 | have | 25.3 | 3 55 | - | 1.84 | 26.0 | 37 | 31 | 26 | not | 26.0 | 4 52 | 6 06 |
| 16 | 0.78 | 23.0 | 35 | 0 | 0 | have | 23.0 | 0 32 | 2 37 | 1.27 | 24.0 | 35 | 1 | 0 | have | 24.0 | 3 54 | 6 12 |
| 17 | 1.23 | 27.4 | 33 | 27 | 23 | not | 27.4 | 3 37 | - | 2.05 | 28.3 | 35 | 33 | 28 | not | 28.3 | 4 51 | 6 06 |
| 18 | 0.75 | 25.0 | 15 | 1 | 0 | have | 25.0 | 3 15 | - | 1.32 | 25.8 | 25 | 6 | 5 | have | 25.8 | 4 46 | 6 21 |

* Condition: Relative humidity 85%, temp. 20°C, 2cm in thickness. ** Japanese Architectural Standard Specification. = Double setting

## KEEP GRINDING TEMPERATURES LOW, *continued from p. 145*

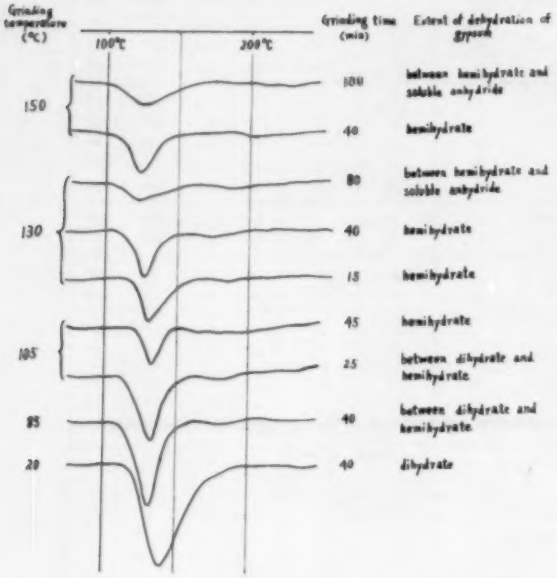


FIGURE 2B. Differential thermal analysis curves of cements ground with dihydrate. Heating rate: 5 deg. C./min., sensibility: 1/1

moved by lightly beating the media three times and then lightly rubbing the media with a cloth. After weighing out cement necessary for these tests, the surplus cement and grinding media were returned to the mill at every grinding interval.

Grinding was continued until the cement reached 3,350 cm.²/g. Blaine and the finished cement was sieved to exclude the flake. There was no grit in any finished cement.

**The grindability of cement was nearly the same** at temperatures of 20 deg. C. and 85 deg. C., with either gypsum or the hemihydrate added. But at 105 deg. C., flake and cement coating were slightly increased when grinding over 3,000 cm.²/g. Blaine, and the grindability began to decrease.

At the grinding temperature of 130 or 150 deg. C., cement coating and flake increased remarkably. The grindability of clinker with or without gypsum decreased markedly.

At grinding temperatures below 105 deg. C., cement with gypsum contained less flake and showed less cement coating and grinding time than cement with hemihydrate or without gypsum. At 105 deg. C., gypsum gradually dehydrated to hemihydrate in the process of grinding and eventually lost its effect as a grinding aid. The grindability was reduced slightly. At grinding temperatures above 105 deg. C., the grindability of cement with gypsum was nearly the same as that of cement with hemihydrate, because gypsum rapidly dehydrated to hemihydrate in the process.

**Clinker without gypsum was the most difficult to grind.** It became clear that gypsum, especially the natural dihydrate, has an effect as grinding aid for cement clinker.

With the increasing tendency to flake and ball coating, clinker without gypsum was nearly the same as that of cement with added hemihydrate. The grindability of clinker without gypsum is nearly the same as that of clinker with hemihydrate: hemihydrate has hardly any effect as grinding aid.

The clinker passing 5 mm. sieve needed very little longer grinding time, compared to that passing 2.5 mm. sieve.

The cement ground with cylpebs showed the least cement coating or flake and needed the least grinding time at every grinding temperature. On the contrary, cement ground with balls without cylpeb showed the most cement coating or flake, and needed the longest grinding time.

The granulometric composition of cement is shown by Rosin-Rammler's equation $\log R(x) = -kx^n$ in which $R(x)$ is residue of air elutriation in limit of particle diameter of $x\mu$.

In general, the higher the grinding temperature, the more the value of $\underline{n}$ decreased and that of $\underline{k}$ increased. At the grinding temperature of 20 to 105 deg. C., there was no remarkable difference in the change of granulometric composition as well as in grindability. The value of $\underline{n}$ of cement ground at 130 or 150 deg. C. was much smaller; that of $\underline{k}$ was much greater. Cement contained more particles greater than 40$\mu$ and that smaller than 15$\mu$, compared to the cements ground at 20-105 deg. C.

In the case of cement with added dihydrate at the grinding temperature of 20 to 105 deg. C., the value of $\underline{n}$ was nearly constant through the grinding process. At the higher grinding temperatures 130 deg. C. or 150 deg. C., the value of $\underline{n}$ decreased gradually with the progress of grinding. In the case of cement with added hemihydrate, even at the grinding temperature of 20 deg. C. the value of $\underline{n}$ decreased in the progress of grinding.

The decrease of the value of $\underline{n}$ in the case of clinker without gypsum was the same as that of cement with hemihydrate.

It must be concluded from these results that

*Please turn to page 148*

# "Our Universal Wobbler Feeder SMOOTHED OUT DISCHARGE FLOW OF WET LIMESTONE - REDUCED AUXILIARY EQUIPMENT MAINTENANCE"

*Says Maule Industries, Inc., Miami, Florida*

"Maintenance on auxiliary equipment has been reduced because the Wobbler Feeder smoothed out the discharge flow, minimized the tendency of wet material to 'surge' onto conveyors."

Maule Industries supplies concrete and concrete products to building and road contractors. They have a total of 21 plants and warehouses throughout eastern Florida.

"At our Prospect Quarry near Fort Lauderdale, we're working with Oolitic limestone which has a moisture content from 5 to 20%. Before installing a Wobbler Feeder, material was fed by a vibrating grizzly feeder. This was unsatisfactory because the grizzly permitted the relatively moist rock to 'surge' from feeder to roll crusher to conveyor belt." According to Maule Industries, Inc., this 'gushing' of material and water created an abnormal cleanup problem around the equipment and the production level was substantially affected.

"The Wobbler Feeder really proved it could handle this wet material. After its installation our production level was increased by as much as 65 tons per hour. The Wobbler supplies an even flow of rock to the roll crusher with a highly efficient separation of fines.

"In fact, the Wobbler was so effective we installed another one at our Red Road Quarry in combination with a Universal Impact Master."

**How Universal's Wobbler Feeder Works** — The Universal Wobbler Feeder feeds and scalps in one operation. Elliptical-shaped bars form the bed of a hopper and are set in alternate vertical and horizontal positions. Turning of the bars imparts a rocking, tumbling forward motion to the load. Fines drop through spacing between bars. Oversize is delivered off the end. Unlike a screen, the Wobbler does not vibrate — nor will it clog in wet sticky material.

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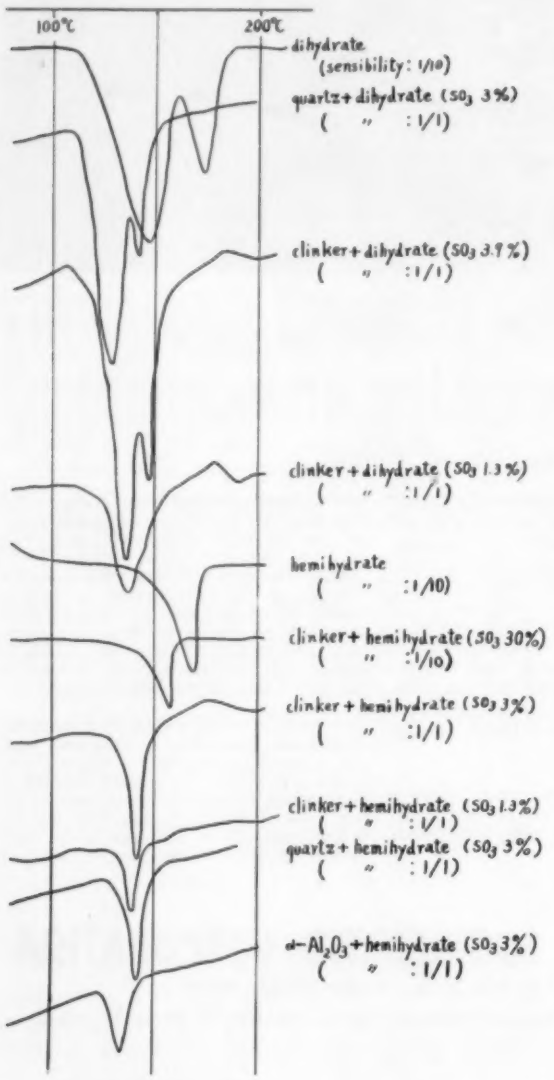
## KEEP GRINDING TEMPERATURES LOW, *continued from p. 146*

gypsum dihydrate has a remarkable effect as grinding aid. It not only lowers the total grinding time, but also gives more medium size particles (between 15 and 40$\mu$) of cement.

Cylpebs as grinding media gave better granulometric composition of cement than balls. Even at 130 deg. C. the granulometric composition of cement ground up to 2,900 cm.$^2$/g. Blaine was the same as that ground at 20 deg. C.

FIGURE 2C. Differential thermal analysis curves of gypsum dihydrate, hemihydrate and those mixed with clinker, quartz or $\alpha Al_2O_3$. Heating rate: 2 deg. C./min.




When grinding over 2,900 cm.$^2$/g., the cement coating began to increase, (Fig. 1) and the value of n decreased.

Gypsum dihydrate has a remarkable effect as grinding aid at the grinding temperatures below 105 deg. C., but the effect disappeared at high grinding temperatures above 105 deg. C. Decrease of grindability of cement at high grinding temperatures was due to the decrease of the grindability of clinker at the high temperatures with the dehydration of gypsum dihydrate to hemihydrate or soluble anhydrite.

**Dehydration of gypsum in cement** in the grinding process was examined by differential thermal analysis (Figs. 2a through 2c). Differential thermal analysis curves of cement with gypsum in the mill at the various grinding temperatures are shown in Fig. 2b. In differential thermal analysis curve, the dehydration temperature of hemihydrate in cement appeared to be nearly the same as that of raw gypsum in cement.

To clarify this phenomenon, the results of differential thermal analysis of dihydrate or hemihydrate mixed with ground clinker, quartz or $\alpha$-$Al_2O_3$ are shown in Fig. 2c. The less gypsum in the mixture, the peaks of temperatures of the primary and secondary dehydration of gypsum decreased, but the temperatures to start the dehydration did not change. It appears that dilution of water vapor from gypsum dehydration by mixing the above materials lowers the temperatures of the peaks.

The dehydration of gypsum in cement ground at 85 deg. C. for 40 min. ranged between dihydrate and hemihydrate. Dehydration of gypsum in cement ground at 105 deg. C. for 25 min. was also between dihydrate and hemihydrate, and that ground at the same temperature for 40 min. was almost entirely hemihydrate. The extent of dehydration of gypsum in cement ground at 130 deg. C. for 15 or 40 min. was nearly completely to hemihydrate, but that ground at the same temperature for 80 min. was between hemihydrate and soluble anhydrite.

The dehydration of gypsum in cement ground at 150 deg. C. for 40 min. was nearly to hemihydrate, and that ground at the same temperature for 100 min. was between hemihydrate and soluble anhydrite. At the grinding temperatures above 130 deg. C., gypsum in cement rapidly dehydrated to hemihydrate and then to soluble anhydrite.

Soluble anhydrite is said to be very hygroscopic.

*Please turn to page 154*

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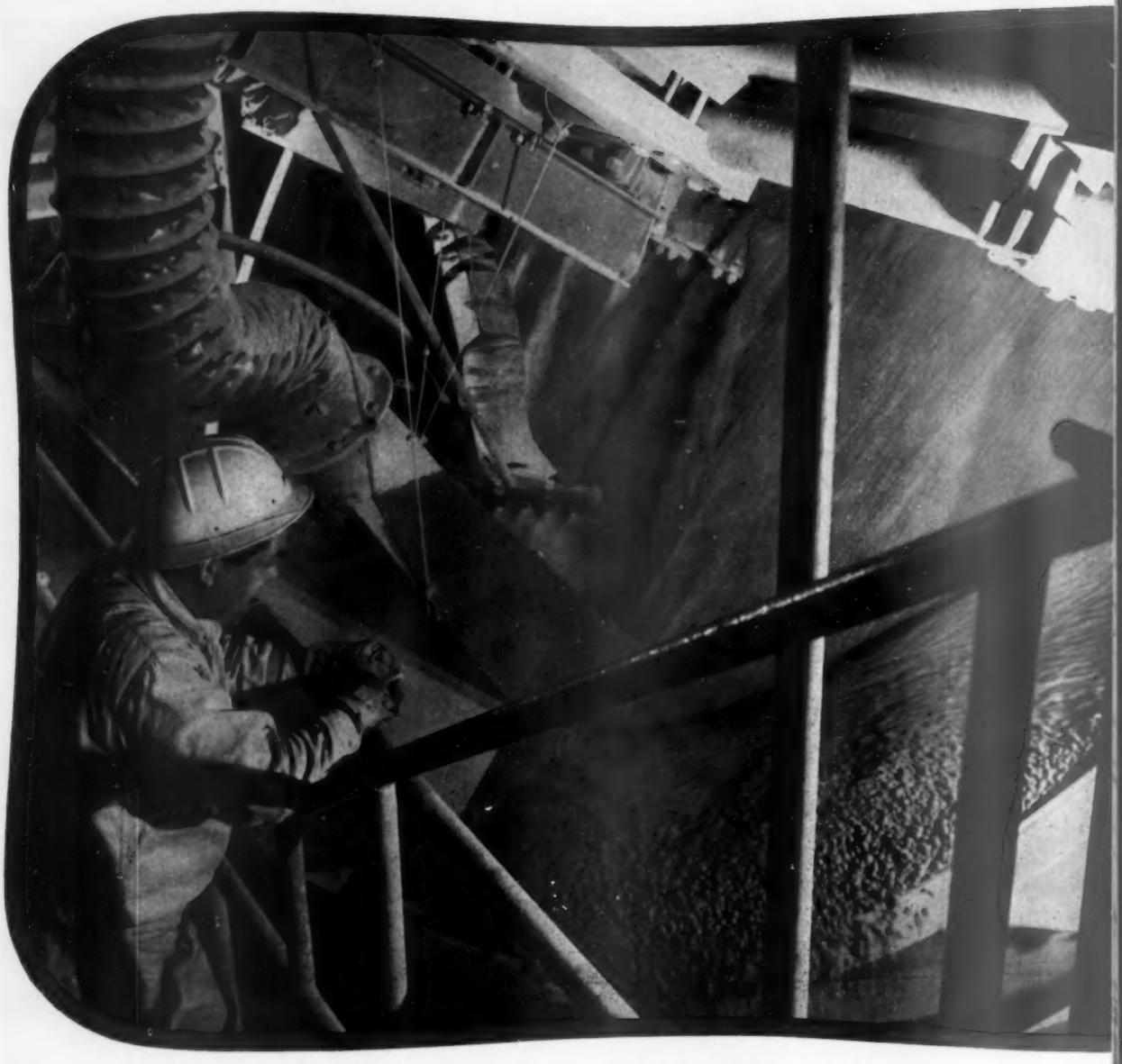

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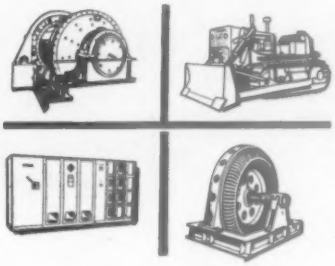

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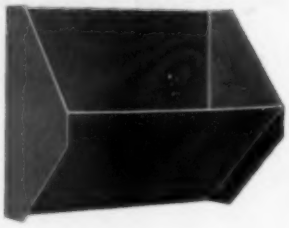

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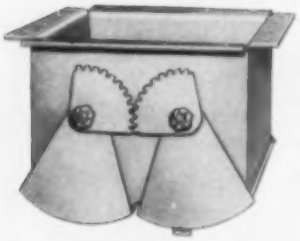

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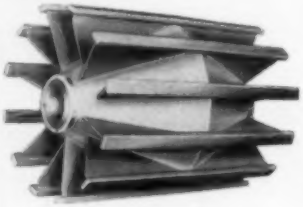

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are colored by their own experience. Yet, as our author points out: "Employe relations are vitally important. It is essential that you sell yourself and the company to both employes and their union representatives. The operator with a good labor contract did a good selling job. Treat a union representative like you would a good customer. Union relations will improve immediately. Feuding with union representatives benefits no ready-mixed concrete producer." That comes from a man who has had the kind of experience that could have made him bitter.

As in every other aspect of the industry, the author gives detailed instructions on how to deal with labor union representatives and how to negotiate a contract. Naturally, this and many other sections of the book are of as much interest and value to the producers in any branch of our industries as to the ready-mixed concrete producer. It is true that there are numerous general works on successful handling of labor relations, and our author recommends one such; but what makes his own book so helpful is that he has applied much of this general theory and practice. Thus he can describe in detail his own experience with such theory and the experience of this industry.

Although, as would be expected in the circumstances, this book is very much a record of personal experience and observation, our author has drawn freely from sources available to all producers, and has given much credit to the National Ready Mixed Concrete Association, the Portland Cement Association, the American Society for Testing Materials, the American Concrete Institute, etc. This adds to confidence in the text because it shows that the author is thoroughly well read on current literature, and is accustomed to checking his own experience and conclusions against those of others.

**A book like this, if to be used as it should**, as a textbook, ought to be very thoroughly indexed with cross references to related subject matter. The table of contents, sufficiently subdivided, will be helpful in showing the scope, but the very nature of the text leads to considerable repetition and later thoughts that came to the author, after what at the time he may have considered a completed discussion. It would be rather difficult for any but an expert to index such a text, without a thorough understanding of the whole and the significance of these interconnecting discussions.

We believe that for the young men most interested, it would be an excellent thing for them to make up their own card index as they read along.

*Please turn to page 154*

# Grinding mills grow... operating costs shrink

## 2000-hp mill does work of multiple units — at far less cost

It's the big mill that grinds out profits. Want proof? In a typical installation, a giant 13 by 20-ft, 2000-hp Allis-Chalmers mill replaced two 10½ by 17 units. Operating costs were cut by a whopping 25% without losing one ounce of capacity.

Grinding mills are on the grow. The single mill conserves floor space and affords better quality control with its improved circuits. Watch for the 2500 and 3000-hp Allis-Chalmers mills soon to be announced.

**ALLIS-CHALMERS**

See your A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. In Canada, write Canadian Allis-Chalmers Ltd., Box 37, Montreal, Quebec.

A-5936-CM

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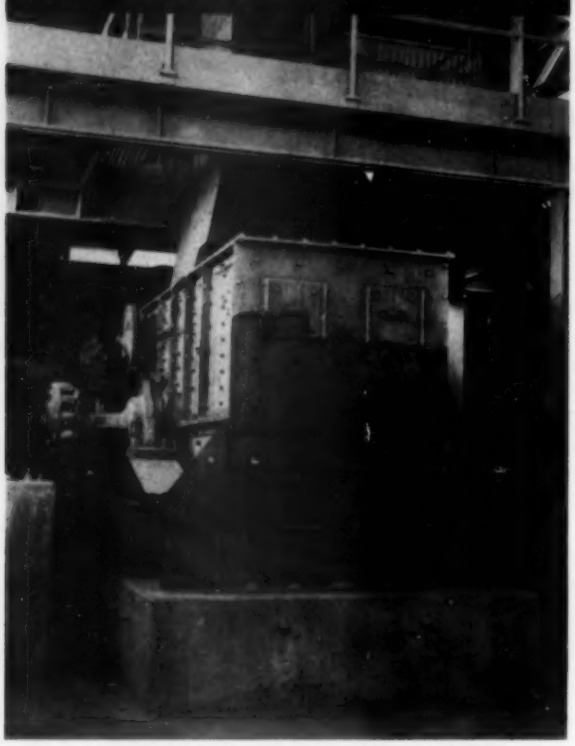
*Another size reduction problem solved by Hammermills, Inc.*



*Bulldog Non-Clog Hammermill*

**Crushes 375 to 400 tons wet limestone per hour**

Limestone fed to this primary Hammermill at a new Midwestern cement plant contains 12% silica. It is mixed with clay and is high in moisture. The Bulldog Non-Clog Hammermill crushes this material at a rate of 375 to 400 tons per hour with a power consumption of 600 h.p.

Bulldog Non-Clog Hammermills are known throughout the industry for their ability to handle tough jobs. They'll give more capacity per horsepower. They require less maintenance.

Hammermills, Inc. can help you lower costs and increase your capacity. For the names of the Hammermills representative in New York, Chicago, St. Louis, Toledo, Dallas, Denver, Los Angeles, and Melbourne, Fla., simply write us.

Manufacturers of Hammermills for primary and secondary crushing • Impactors • Jaw Crushers • Roll Crushers • Cone Crushers • Wobbler Feeders • Apron Feeders

HAMMERMILLS, INC.

Subsidiary of PETTIBONE Mulliken Corp.

625 C Avenue N. W., Cedar Rapids, Iowa

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## ROCKY'S NOTES, *continued from p. 152*

In this way they will become genuinely acquainted with the contents, and when they are later faced with some special problem, it will be easy to find the right text without waste of time. We think this statement in itself should assure the reader of the comprehensive character of the book, for it seems safe to say that we can conceive of no difficulty that may arise in a ready-mixed concrete business which has not been discussed somewhere in this book and by an expert. END

## NCSA MEETING, *continued from p. 138*

sentation of safety awards and (2) a special session for executives, for discussion of subjects important to them. It is planned to have a qualified speaker on safety, and to recognize the award winners collectively.

The Executive Committee of the Manufacturers Division, NCSA, met the day before the regular Board meeting to formalize plans for the big Show next February. This meeting was chairmanned by W. E. Collins, Atlas Powder Co., who heads the Division. Reports indicate that the Show will be as inviting and informative as ever, and it is believed that all available space for the exhibits will be occupied.

The 1960 mid-year Board meeting of NCSA will be held at the Greenbrier, White Sulphur Springs, W. Va. The 1961 annual meeting of the association will be held during January at the Americana Hotel, Miami Beach, Fla. END

## KEEP TEMP. LOW, *continued from p. 148*

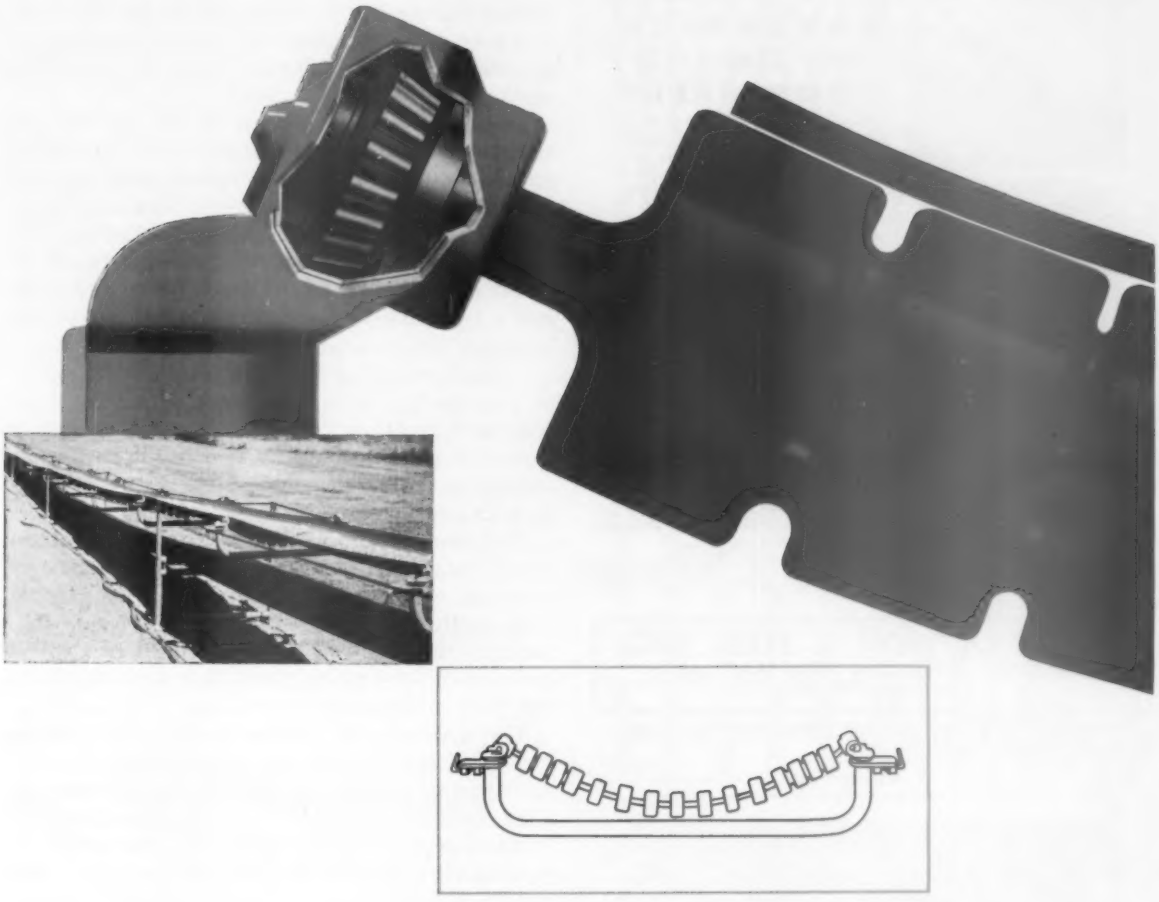
It appears that soluble anhydrite produced in cement by grinding at the high temperature rehydrated partially to hemihydrate when cement was scooped out from the mill. We would guess that gypsum in cement is dehydrated nearly completely to soluble anhydrite in the grinding process at the temperatures above 130 deg. C.

The quality of cement ground to 3,450 cm.$^2$/g. Blaine at the various grinding temperatures is shown in Table I.

The higher the grinding temperature, using the same gypsum and grinding media, the shorter the setting time of cement became. This result agrees with those of S. Mori and others who say that the

*Please turn to page 156*

## Bearing Location is the Key to Long Service Life



# JOY LIMBEROLLER® CONVEYOR IDLERS

Joy Limberoller Conveyor Idlers give many times the normal service life, because the two bearings rest in slots in the support brackets—well away from spillage. On conveyor lines carrying sand, crushed rock, and other abrasive materials, Limberollers have given more than ten times the service life of steel idlers.

Limberoller Idlers consist of a neoprene coated wire rope to which are moulded neoprene discs. The ends of the rope turn in sealed bearings. This design not only eliminates clogging and freezing of the bearings, but also makes the idlers easy to service—they can be replaced while the belt is moving.

Limberollers are economical, not only because of long service life, but also because they can be spaced further apart than steel idlers. They are corrosion and flame resistant, self-cleaning, and eliminate the "bump" typical of steel idlers.

For complete details, write for Bulletin 342-27.

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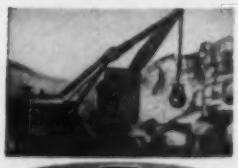
**For Fast "Secondary Breakage"**



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| | Wide Range of Sizes and Weights: | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Pear shape (lbs.)..... | 1300 | 2000 | 3300 | 4000 | 5200 | 6500 | 8000 | 10,000 |
| Ball shape (lbs.)..... | 500 | 1000 | 2000 | 5200 | | | | |
| Spherical shape (lbs.) .. (for magnet use) | 470 | 950 | 1650 | 2400 | 3000 | 3700 | 5400 | 6900 |

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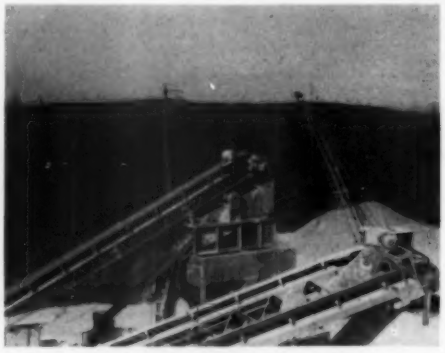

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*"How to Estimate Screen Area Requirements" — part of the useful data in our new 8-page Catalog. (Write Dept. RP-6 for your copy.)*

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## KEEP TEMP. LOW, *continued from p. 154*

higher the value of n, the longer the setting time. However, the setting time of cement ground with cylpebs having the largest value of n was the shortest.

Generally, cement ground at 20 deg. C. had slight tendency to false setting, and even cement ground at 20 deg. C. with hemihydrate showed normal setting after aeration for 15 hrs. Cement ground at 20 deg. C. with dihydrate had scarcely any tendency to false set by aeration. Those cements ground at 85 or 105 deg. C. with dihydrate had a tendency to false set by aeration, but the tendency disappeared after aeration for 15 hrs.

Cement ground at 130 or 150 deg. C. with natural gypsum had a remarkable tendency to false setting by aeration. The tendency to false set when ground at 85 or 105 deg. C. with hemihydrate was similar to that of cement ground above 130 deg. C. with gypsum.

The poorer the particle size distribution of cement, the greater the tendency to false setting by aeration, even for cement ground at 20 deg. C. with gypsum. Therefore, we must conclude that not only the extent of the dehydration of gypsum but also the size composition of cement affects its tendency to false set by aeration.

The strength of mortar made with cement ground at low temperature was generally greater than that of cement ground at high temperatures. This phenomenon seemed to result from the greater value of n in the granulometric composition of cement ground at the low temperature. **END**

## SHAFT KILNS, *continued from p. 94*

quality and use of high-volatile coals allow kilns to be insulated without danger of clogging and fusing of clinker to the lining.

Eleven years ago I attempted to overcome the difficulty created by uneven radiation loss by feeding nodules richer in fuel to the perimeter of the kiln, near the firebrick lining. This was achieved by attaching and removing periodically a centrally directed chute to the discharge end of a rotating feeder. Although the method proved to be too complicated to be accepted for routine operation, it gave important information about the radiation loss near the kiln shell, as the fuel requirement of the kiln edge was 80 percent higher than the requirement of the kiln center. This correlated well with the measured radiation loss through the kiln shell.

Cement grinding in the Gippsland plant is performed by three mills. Two are used for prelim-

inary grinding, one of them in closed circuit, the other air swept in open circuit. The preliminary ground clinker and the tailings from the classifier of the closed-circuit system is conveyed for finish grinding into a three-compartment tube mill.

The cement is transported either in bulk or in bags which are packed in a three-tube packing machine.

It is evident from the layout that the plant is a compact one, occupying a comparatively small area in relation to the quantity of cement produced.

There are three laboratories in the plant, one for continuous shift control, another for experimental work and research, and a third for standard specification and concrete tests. **END**

## COST CONTROL, *continued from p. 97*

we are not doing enough welding at our plants. We have kept our scrubber at Eliot in first-class shape by continuous welding. After handling about 15 million tons of material, this scrubber still has its original liners and lifter bars.

The welding rod we are now using in this scrubber has been very effective. At the present time we have not accumulated enough cost information to make the kind of comparisons that we have made with other types of equipment maintenance, but that is why we have started a real welding program. Some day we will be able to apply our cost information to welding.

**Records helped us make a savings on our rod mill.** Records showed us that rod wear was reduced by shutting the mill down loaded. This prevents the grinding of metal on metal when the mill is restarted.

Before we started this, the mill operated 20 min. without a load, causing excessive wear to the rods and liners.

We used 296,350 lb. of rod last year and produced 240,000 tons of fine rod-mill sand during the same period. Without depreciation, the cost-per-ton figures close to 19 cents.

Naturally, we couldn't have put in this system without the wholehearted support of a progressive management. They have been behind me from the start and have been patient while we were developing the details. We are still working at it and are open to suggestions for improving the system. But you can see that we have made some progress.

We found, too, that our system has been of great help to the purchasing department. They have given us some fine cooperation to help us use our records efficiently. By knowing more about our actual requirements they have been able to buy much more effectively. **END**

STARSTEEL
HEAVY DUTY SPACE SCREENS

The special alloyed high-carbon wire in tough, rugged STARSTEEL Screens has amazing resistance to abrasion—in some cases service life is double that of ordinary screens.

STARSTEEL's rigid, accurate weaving resists distortion—precision-applied hook strips make installation easier, insure tighter uniform tension, prevent breaking. But these are only three of the big reasons why STARSTEEL Screens last longer—cut replacement costs as much as half—reduce downtime and maintenance—promise uniformly better finished products.

STARSTEEL "double duty" Screens are always sharply competitive in price. *Write for catalog.*

*Fast Shipment* from stock on most weaves and sizes.

Star will produce screens or cloth from stainless or other steel alloys, Monel, brass, bronze, copper, aluminum or any metal that can be drawn into wire. Inquiries invited.

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*Subsidiary of Ludlow-Saylor Wire Cloth Company, St. Louis, Mo.*

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# NEW LITERATURE

### Truck driver's manual helps keep records, increase life

WHITE MOTOR CO. has released the 1959 edition of the White Driver's Manual for truck owners, fleet supers, and drivers. Based on the experience of successful drivers, and the knowledge of factory engineers, fleet supervisors and others, the 158-page manual is designed to help the truck driver conserve his equipment and keep it operative.

Contents include sections on correct preparation, starting, taking-off, road practices, parking, and care, plus reference data on cooling system capacities, electrical accessory loads, etc. Special data on the driver's own rig can be kept on several pages provided for the purpose. The manual is available for $1.25 through the company.

### Centrifugal dust collector

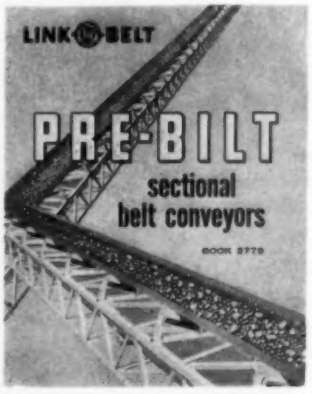
AMERICAN AIR FILTER CO. has released a bulletin on the characteristics and operation of its new AMERclone dry centrifugal dust collector. Ranging in capacity from 9,000 to 72,000 cfm., the standard units operate differently from any other high-efficiency centrifugal collector, the maker states. They are used in the fly ash and other industries. Said to have efficiency at least as high as other units, the AMERclone reportedly requires less space, has better abrasion resistance. Bulletin 291A highlights the features of the new collector.

***Enter 700 on Reader Card***

### Pre-built sectional conveyors

LINK-BELT CO. is distributing a 40-page handbook on its line of standardized Pre-Bilt sectional belt conveyors. Selection of the right equipment for the job is quick and easy with the book, the company reports. The conveyors are available in four widths of 18, 24, 30 and 36 in., and quick delivery is possible since they are stocked at nine Link-Belt plants in the U. S. and Canada.

Another advantage: Standardized conveyor components are pre-engineered and shop-assembled for lower cost. Installation is designed to be simple, also cutting costs. The handbook, Book 2779, tells how to select a conveyor, and gives all the factors which determine capacity. It also lists 22 components and accessories designed for the Pre-Bilt units.




***Enter 701 on Reader Card***

### Space screens

THE COLORADO FUEL AND IRON CORP. has released a 4-page folder, entitled "Super-Tempered and Wisscoloy Precision Space Screens." It describes both types of screen fabric and also offers descriptive information on standard types of hooking available, recommended wire sizes versus openings and standard specifications. A complete space cloth order is included.

***Enter 702 on Reader Card***

### Screen washing

PIONEER ENGINEERING announces an 8-page bulletin describing its new line of Hydro-Screen washing plants. Up to three times the capacity of a dry screen are claimed for the new washing and screening principle.

A drawing illustrating the basic plant, drawings of several different models and specifications of the several models available are included. How the plants can be enlarged with the producer's business is also shown in Bulletin 690. ***Enter 703 on Reader Card***

### Accident Facts yearbook, office accidents book

THE NATIONAL SAFETY COUNCIL has released two pieces of literature which will interest rock products operators.

The first, the Council's 1959 "Accident Facts" statistical yearbook, contains facts and figures on all types of accidents — including industrial and traffic. Ideas and facts for planning safety programs, preparing reports and making speeches are contained in the 96-page book. The single-copy price is $1.85.

The second, a free pamphlet, is "Accidents in the Office!" Common sense and courtesy will eliminate many office accidents, the publication says. Sample tips it contains: Keep to the right at blind corners in the office; Don't smoke near such highly flammable materials as duplicating fluid. To get a copy of either publication, write the Council, at 425 N. Michigan Ave., Chicago 11, Ill.

*(Continued on page 160)*

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For intermittent or light service, fine or small-lump materials.

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**6000**
For intermittent operation, medium capacities or continuous handling of lightweight material.

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For continuous operation, high capacities, heavyweight, abrasive materials.

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For continuous service, highest capacities, heaviest and coarsest materials.

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***In these 5 series—LINK-BELT has an exact idler for every type of belt conveyor application***

Here is industry's most complete belt conveyor idler line, by far. Ranging in application from light or intermittent service to continuous heavy-duty operation, Link-Belt idlers are made in both 20° and 45° troughing for a broad range of belt widths—with rolls of various diameters, materials and coatings. This broad coverage eliminates wasteful over- and under-engineering . . . permits "pin-pointing" that results in substantial savings in purchasing and maintenance. For further information on over 630 types and sizes of Link-Belt idlers, contact your nearest Link-Belt office or authorized stock-carrying distributor. Look under CONVEYORS in the yellow pages of your phone book. Or write for our new Catalog 2716.

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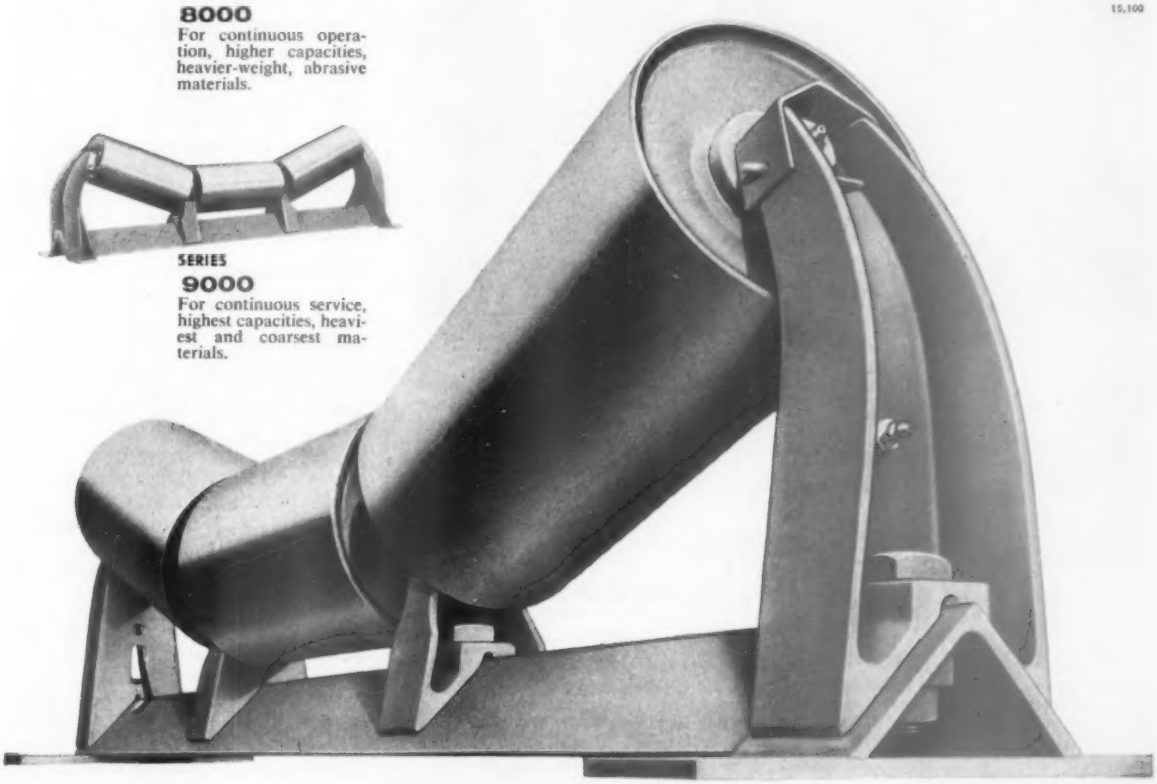

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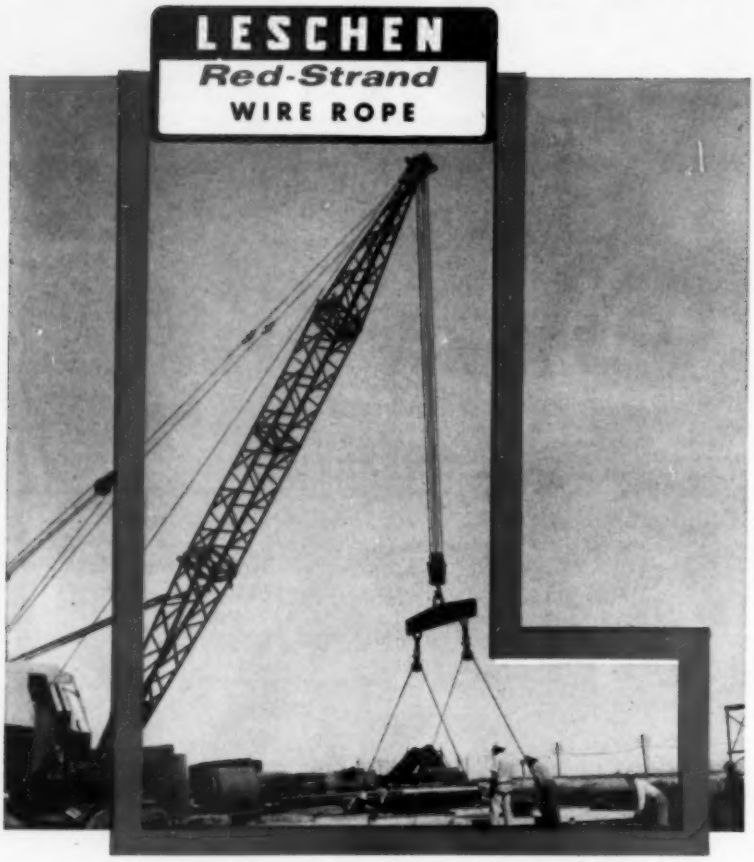
# when the going gets rough-

# give 'em "L"




*When the load is on the crane*, you'll be glad you rigged with *Leschen*—the wire rope that's the same top quality in every foot of every reel. At Leschen there are new machines with exclusive new continuous-flow technique. Try Leschen Red-Strand Wire Rope. Its uniform quality makes your operation safer, your replacement time farther in the future.

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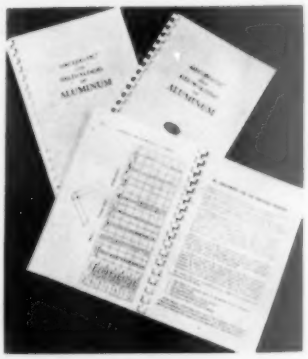
## NEW LITERATURE

*(Continued from page 158)*



### Welding aluminum

AIR REDUCTION SALES CO. announces a new 120-page book entitled "Aircomatic and Heliwelding of Aluminum." It fully describes the techniques of welding aluminum with the two processes, which use gas-shielded metal-arc and tungsten-inert-gas techniques, respectively. Selecting the proper process for certain jobs, and the weldability of aluminum and its alloys, are two of the major topics covered. ***Enter 704 on Reader Card***

### Bucket cranes

NORTHERN ENGINEERING WORKS has released an illustrated 4-page bulletin that describes its line of heavy-duty cranes, featuring the large diameter hoisting drums, transmission type gear housing, hardened steel gears and pinions and roller bearings.

***Enter 705 on Reader Card***

### Diesel engine

ENGINE DIV., Caterpillar Tractor Co. has published a new book entitled "Engine Log Book." It covers 13 months of operation and contains space for daily entries on fuel and lube oil consumption. Monthly entries may be transferred to a 12-month summary sheet, and a post card is enclosed with which the operator can order a new book.

***Enter 706 on Reader Card***

### Motor-generator set

KATO ENGINEERING CO. has published a 2-page bulletin on its line of fully housed motor-generator sets. Running on 400 cycle power, these dc. generators are applicable to use in all industries and for use in high frequency lighting. ***Enter 707 on Reader Card***

### Production in gravel pits

CATERPILLAR TRACTOR CO. has just published an 8-page booklet that demonstrates how to achieve maximum production in rock, sand and gravel pits. The booklet illustrates the use of dozers, wheel tractors with scrapers and wagons, motor graders and power shovels in producing materials. Removing overburden, feeding hoppers, haul road maintenance and loading trucks are discussed.

*Enter 708 on Reader Card*

### New conveyor belting said to boost capacity 40 percent

MONOBELTING CORP. has released a brochure describing its new conveyor belting. Radical because it eliminates troughing idlers, the product is said to have these other advantages: (1) can run considerably faster than conventional belts with troughing idlers, since there is no destructive flexing as the belt passes from troughed idler to flat pulleys.

(2) Will deliver 40 to 200 percent more material than a conventional troughed belt of the same width, traveling at the same speed, since the entire width is usable load area. (3) The elimination of troughing idlers reportedly can save 20 percent in initial conveyor costs, and can mean lower maintenance and replacement costs. (4) Higher angles of conveyor incline are permissible, since the load is entrapped on three sides and load shifting over troughing idlers is eliminated.

The maker states that the belting can mean boosts in capacity of existing conveyors of 50 to 150 percent. The belting is available in widths up to 48 in., and is available in a wide variety of grades and types.

*Enter 709 on Reader Card*

### Semi-automatic welder

AMERICAN BRAKE SHOE CO. has issued a 4-page folder which illustrates and describes its portable, semiautomatic welder for buildup and hardfacing. The welder features simple arc length control, fingertip feed of welding wire through electrode holder.

*Enter 710 on Reader Card*

### Scraper self-loads 55 tons

R. G. LETOURNEAU, INC. has released Data Sheet 976-3-9 on its twin-bowl scraper which can self-load 55 tons. An electric motor in the hub of each of the unit's 8 wheels gives it the traction to load itself, the front bowl first and then the rear bowl. Reportedly a smaller, 28-ton capacity unit will be announced later. It will have a single scraper unit. Wide-base wheels and automatic proportioning of power to the wheels with the best traction make self-loading possible.

*Enter 711 on Reader Card*

### Anti-rust paint

SPECO, INC. announces Bulletin RAR-2, which describes its Rustrem anti-rust paint. The paint is said to give complete coverage in one coat without use of a primer. It is also said to be suitable for all applications, indoors and out. Available in quantities of from 1 to 55 gal., the paint may be had in clear and 7 colors. The colors are MS black (for severe moisture), Super Aluminum-C (clear base), Super Aluminum-B (black base), oxide green, oxide red, chrome green, medium gray and white.

*Enter 712 on Reader Card*

### Coolers and dryers

MCDERMOTT BROS. CO., INC. has published a 12-page booklet describing its line of coolers, dryers, kilns, steel plate and accessories.

*Enter 713 on Reader Card*

*(Continued on page 166)*


For air or water . . . 3-cone rock bits made of highest Nickel Moly steel in a full size range from 2 13/16" to 7 7/8" for slim hole and shot hole drilling in world-wide formations . . . from soft to hard.

All bits heat treated in our controlled-atmosphere automatic furnaces of latest design to reduce distortion and assure uniformity.

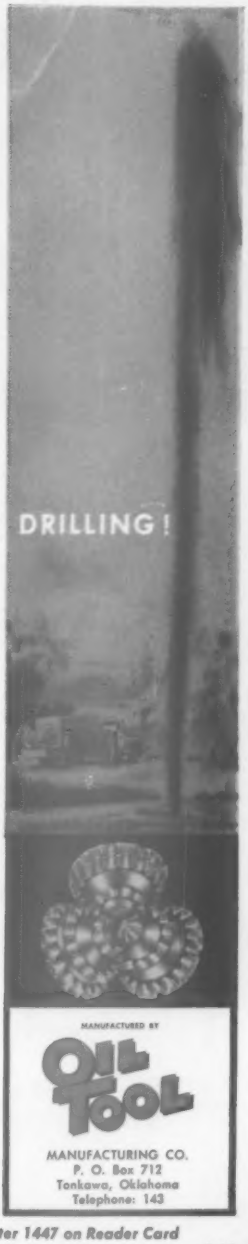
THE LEADERS IN EXPLORATION DRILLING!

Williams HoleMaker ROCK BITS

Tooth design and spacing selected for greatest speed and efficiency, and tungsten-tipped for long, hard drilling.

Finest quality bearings give freest rolling action. Races machined to exacting tolerances to eliminate thrust loads that tend to slant rollers in races. All balls positioned in races with engineered exactness.

Over 15,000 bits of all sizes (with full or jet-hole water or air courses, as requested) are carried in stock to fill practically all orders immediately. Materials and workmanship of every bit are fully guaranteed.



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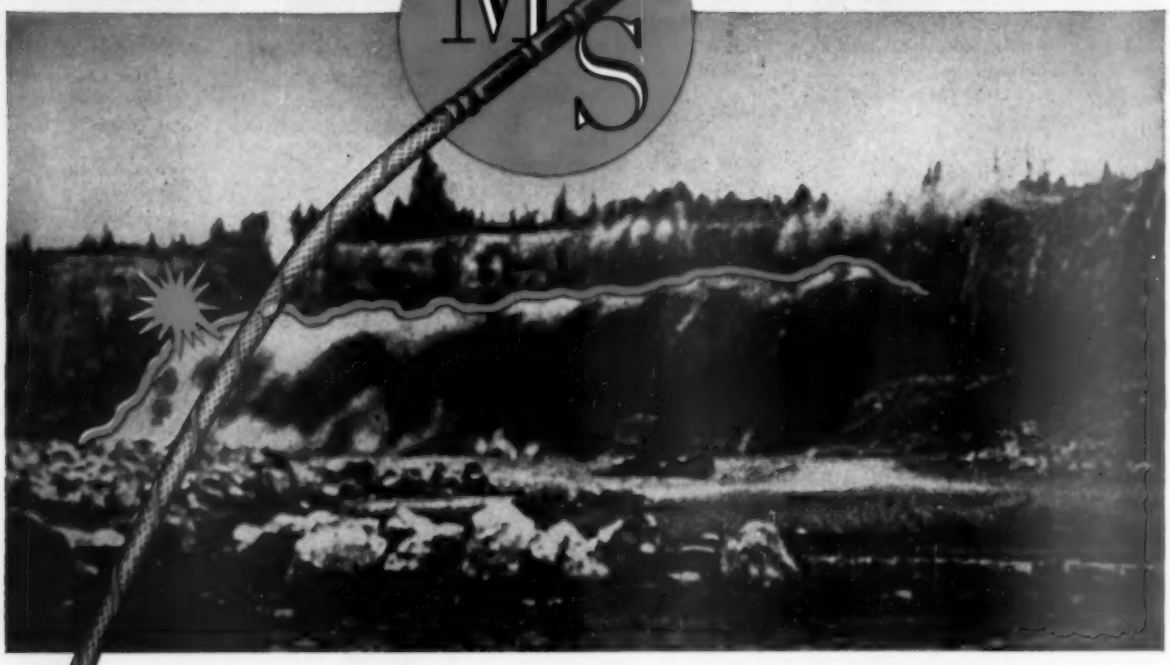
# For Millisecond Delay Blasting

# PRIMACORD® MS CONNECTORS*



## are now available in three periods: 5, 9 and 17 MS

A Primacord MS Connector consists of a metal tube 2¾ inches long, containing an element that produces a delay measured in 5, 9 or 17 MS. A foot of Primacord is crimped in each end of the tube. The Primacord trunk line is cut between holes and the MS Connector joined to each of the two ends with a tight square knot, or lapped with pressure-sensitive tape. Packed 50 to a cardboard tube, 500 to a case.

16 mm movie film from which this enlargement was made.

This unretouched photograph was enlarged from a 16 mm frame. It shows a multiple hole blast detonated with Primacord, and hooked up with Primacord MS Connectors in the trunk line. Note the steady progress of this blast from the point of initiation at the left, as indicated by the red line.

Millisecond detonation of Primacord down lines in medium size holes offers many advantages in multiple hole blasting. Millisecond delay relieves burden, results in improved fragmentation. Less explosive may be required than for comparable instantaneous blasting. Decreased vibration and concussion, controlled throw and reduction of bootlegs are other advantages.

Under certain conditions the danger of cut-off holes can be minimized when Primacord MS Connectors are used on the order of 5, 9 or 17 milliseconds. In any event, the presence of unexploded powder in the muck is less hazardous when Primacord is the detonating agent. It cannot be set off by stray electrical currents, sparks, or ordinary shock, but must be detonated with fuse and cap or electric blasting cap.

For more information see your explosives supplier or write to

*Manufactured by E. I. duPont de Nemours & Company. Available through explosives suppliers

MS-1

## THE ENSIGN-BICKFORD COMPANY

**Simsbury, Connecticut • Since 1836**

**Safety Fuse, Primacord® and Detacord® Detonating Fuse, Ignitacord®, Quarrycord®, Pyrotechnical Devices and Blasting Accessories**

*Enter 1492 on Reader Card*

## READER-SERVICE CARD

RP-10-59

**ROCK PRODUCTS**
79 W. Monroe St.

**OCTOBER, 1959**
Chicago 3, Illinois

**Cannot be serviced after December 1, 1959 postmark.**

Please print or type

Name_____ Position_____

Company (In Full)_____

Company Address_____ City_____ Zone____ State_____

Send information on items identified by key numbers beside or below items of interest to you. List your choice in numerical order. Limit 10 per card.

(1) ..... (2) ..... (3) ..... (4) ..... (5) .....

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BUSINESS REPLY CARD
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### HOW TO USE THIS SERVICE

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2. **New Machinery**
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There is a wealth of valuable information in the manufacturers' booklets offered in this issue. For your convenience, each advertisement, each new machinery and new literature item has been given a key number. Simply fill in the proper key number in the appropriate space on the card above and send it to us. We'll do the rest.

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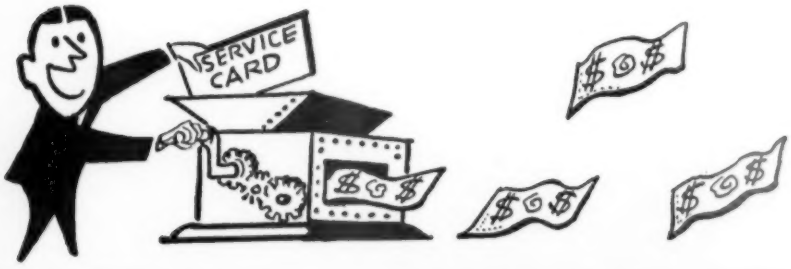
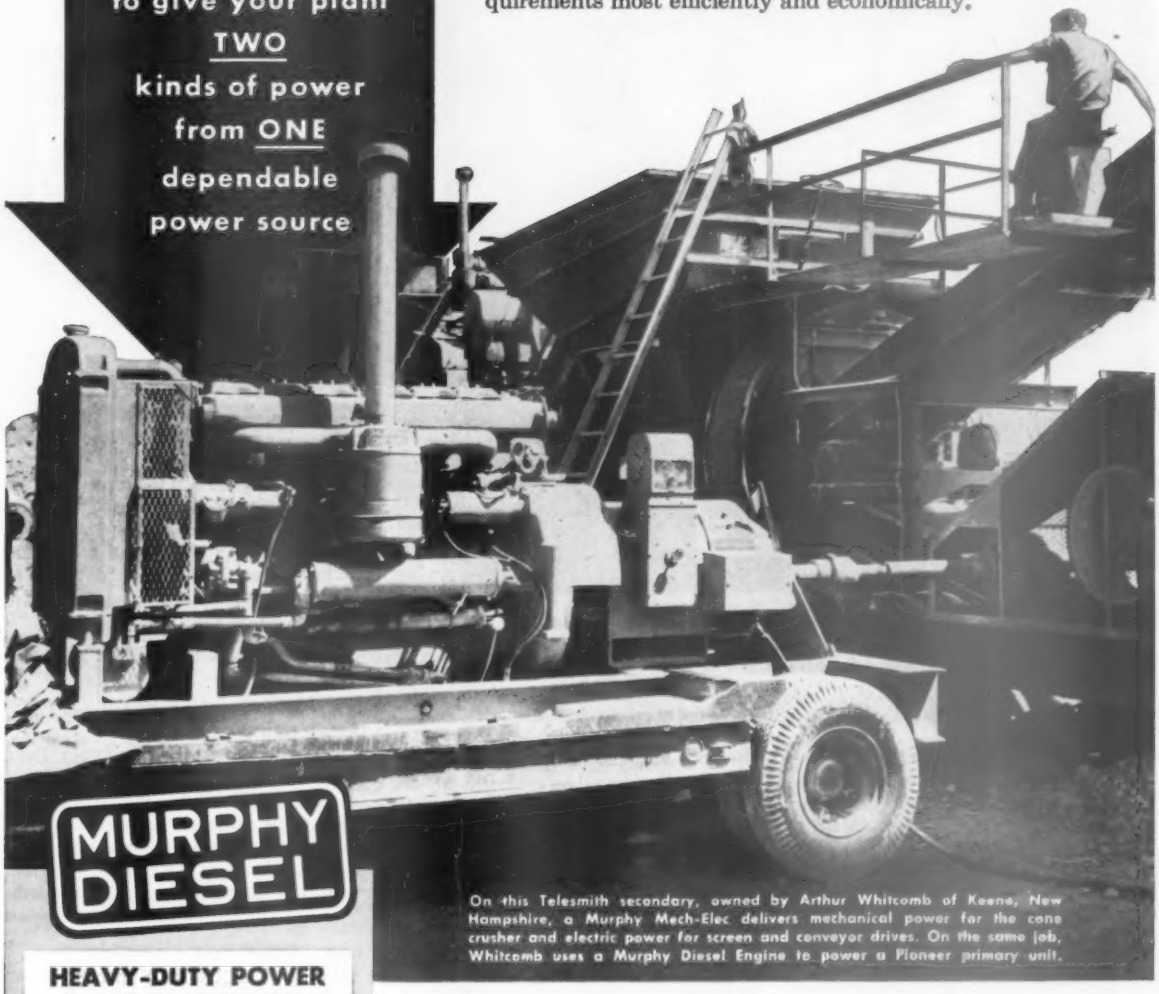


# MURPHY DIESEL MECH-ELEC

The simple profitable way to give your plant TWO kinds of power from ONE dependable power source

One of the most efficient and cost-cutting methods of turning pit or quarry run material into specification aggregate is to use a Murphy Diesel MECH-ELEC—the simple, compact, all-in-one power package that delivers a *combination* of heavy-duty mechanical power and low-cost electric power, separately or simultaneously!

Murphy MECH-ELEC units include all the features . . . "true" diesel operation, unit fuel injection, hydraulic servo-type governor, etc. . . . that have established Murphy Diesel's outstanding record of dependability and economy. From three MECH-ELEC sizes and generator arrangements your Murphy Diesel Dealer can help you select the unit to meet your requirements most efficiently and economically.



On this Telesmith secondary, owned by Arthur Whitcomb of Keene, New Hampshire, a Murphy Mech-Elec delivers mechanical power for the cone crusher and electric power for screen and conveyor drives. On the same job, Whitcomb uses a Murphy Diesel Engine to power a Pioneer primary unit.

MURPHY DIESEL

**HEAVY-DUTY POWER for ROCK CRUSHING**

Murphy Diesel engines and power units are available in sizes from 96 to 264 H.P. with engine speeds of 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 64 to 165 K.W.

## MURPHY DIESEL COMPANY

5315 W. Burnham St., Milwaukee, Wisconsin

SALES . . . PARTS . . . SERVICE

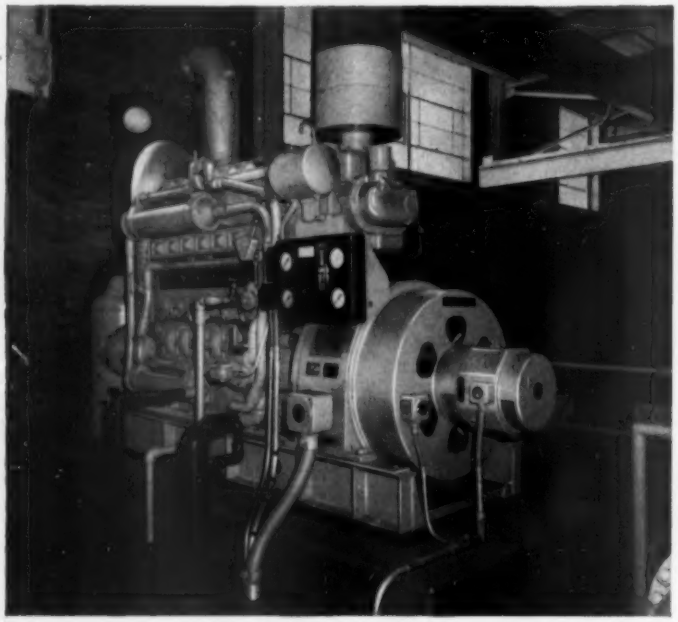
Throughout the Nation

409RO

*Enter 1511 on Reader Card*

# Picture of O-P economy!

**Ohio pumping station saves $300 a month using F-M Opposed-Piston standby diesel for both power generation and pumping**



Compact, lightweight Model 38F5¼ O-P is rated 450 hp. at 1200 rpm., direct drives a 175-kw. F-M alternator and, through right-angle gears, an F-M Pomona Vertical Turbine Pump with 5.5 mgd. capacity at discharge pressure of 105 psi.

Electric power off the flywheel end, high-service pumping off the front—that's the standby job cut out for this Model 38F5¼ Fairbanks-Morse O-P Diesel in the Elyria, Ohio water works serving 60,000 people.

Called into service for 3 to 6 hours a day in the Spring of 1958, the O-P pumped water for $1.50 less per million gallons than purchased power—a $300 per month reduction, including savings on demand charges. Each Saturday the engine makes a test run as the sole high-service on the line.

Versatile as well as economical, the Model 38F5¼ O-P is also ideal for direct-driving other equipment off the rear, with front end of shaft driving an auxiliary generator, crusher, pump, etc. The O-P can be furnished for either diesel, dual-fuel, or spark-ignited operation, and is available as a complete packaged unit with all accessories attached to the frame. Write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

**FAIRBANKS-MORSE**

*a name worth remembering when you want the BEST*

DIESEL, DUAL FUEL AND GAS ENGINES • LOCOMOTIVES • ELECTRIC MOTORS • GENERATORS
PUMPS • SCALES • COMPRESSORS • MAGNETOS • HOME WATER SYSTEMS

*Enter 1445 on Reader Card*


## NEW LITERATURE

*(Continued from page 161)*

### Conveyor belt repairs

AUTOMATIC VULCANIZERS CORP. announces a belt repair manual, describing the use of its Pang patching and sealing materials. These cold, self-vulcanizing materials reportedly provide an easier, faster and safer means of repairing conveyor belts. Neither heat nor pressure are necessary, the maker reports. *Enter 714 on Reader Card*

### Lime and fertilizer spreader

HIGHWAY EQUIPMENT CO. has published a brochure on the L-32S engine-driven combination lime and fertilizer spreader. Developed to meet precise per-acre requirements, the machine spreads evenly and uniformly to both sides, as well as behind the rig. A sister model, the L-22S, has the same general specifications as the heavy-duty L-32 except that it has a smaller engine, making it more suitable for lighter applications.
*Enter 715 on Reader Card*

### Maintenance of unpaved roads

CALCIUM CHLORIDE INSTITUTE has published a pocket-sized 36-page booklet entitled "Maintenance Tips for Unpaved Roads." It tells how to keep unpaved roads in good condition in all seasons. Charts and tables are included; one chapter is devoted to the use of calcium chloride in maintenance procedures.
*Enter 716 on Reader Card*

### Tooth points and adapters

AMERICAN MANGANESE STEEL DIV., Dept. A, has published a 16-page catalog that lists over 400 tooth point and tooth adapter models to suit every type of shovel, dipper and backhoe. It provides reference information for shovel maintenance needs.
*Enter 717 on Reader Card*

### Roller bearings

CHAIN BELT CO. has issued a condensed catalog which covers the company's complete line of self-aligning roller bearings. The new catalog is compiled to offer assistance in the proper selection of bearing equipment. It includes factual information on the bearings' design, specifications, lubrication and installation features.
*Enter 718 on Reader Card*

# *Increase grinding mill efficiency... with* CF&I Grinding Media

The Image of CF&I helps assure increased output in grinding mill operations—through the use of long-wearing, tough CF&I Grinding Balls and Grinding Rods.

The special analysis steels used in these products give an ideal balance between hardness and toughness—thus affording optimum grinding ability plus maximum wearability.

**CF&I GRINDING BALLS** are hot-forged and carefully inspected throughout production and immediately before shipment to assure that they are free of surface pits, circumferential ridges or other surface imperfections. They have excellent resistance to both abrasion and impact, and operate economically in either high or low speed mills. Available in diameters from ¾" to 5".

**CF&I GRINDING RODS** are hot-rolled of a special long-wearing steel which minimizes both bending and premature breakage. All rod ends are square cut and rods are of proper length to fit the mill in which they will operate. All rods are machine straightened to assure maximum line contact between the rods for the full length of the mill. These properties help facilitate rod line-up in the mill and eliminate tangling of the charge. Available in ½" increment sizes from 1½" to 4" in diameter and in various lengths.

For complete information and service on all CF&I Mining Products, contact the nearest CF&I sales representative.

**OTHER CF&I STEEL PRODUCTS FOR THE CEMENT INDUSTRY**
**CF&I Mine Rail and Accessories • CF&I Rock Bolts and Realock Metallic Fabric**
**CF&I Industrial Screens • CF&I-Wickwire Rope • CF&I Grader Blades**

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**THE COLORADO FUEL AND IRON CORPORATION**

*In the West:* **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque · Amarillo · Billings · Boise · Butte · Denver · El Paso · Farmington (N. M.) · Ft. Worth · Houston · Kansas City · Lincoln · Los Angeles · Oakland · Oklahoma City · Phoenix · Portland · Pueblo · Salt Lake City · San Francisco · San Leandro · Seattle · Spokane · Wichita
*In the East:* **WICKWIRE SPENCER STEEL DIVISION**—Atlanta · Boston · Buffalo · Chicago · Detroit · New Orleans · New York · Philadelphia 7074-A

*Enter 1503 on Reader Card*

# NEW PATENTS

by OLIVER S. NORTH

## RECENTLY ISSUED PATENTS ON NONMETALLIC MINERALS*

FIG. 1

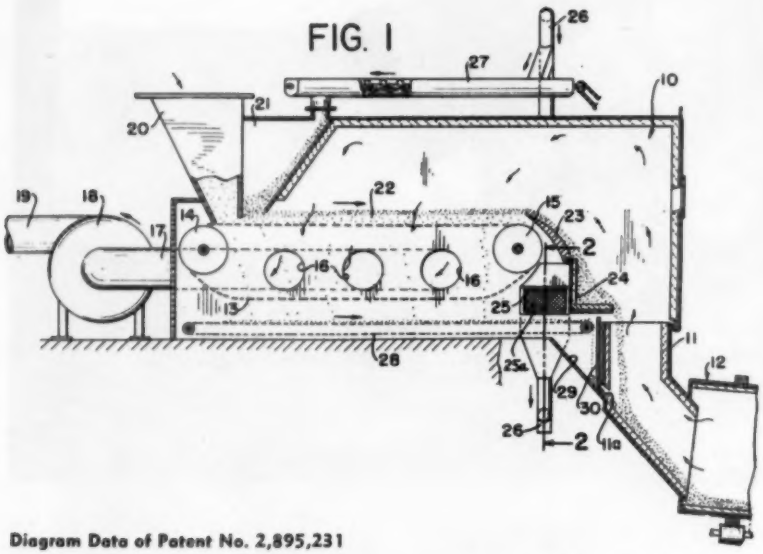



**Diagram Data of Patent No. 2,895,231**

*Fig. 1 is a simplified longitudinal sectional view of one form of this invention. Unheated raw material from hopper (20) is fed to the support belt (13, dashed line) and is immediately blanketed by a layer of partially preheated material from hopper (21). The bed (22) moves toward the kiln (12) while being preheated by kiln gases (un-numbered arrows). An adjustable splitter blade (23) directs a portion of the bed into the kiln, the remainder being withdrawn continuously and returned to hopper (21) by suitable apparatus.*

### Cement

2,895,231—In a preheater for **portland cement** raw material mixtures, the pulverized material is advanced in the form of a bed along a gas-permeable support while hot gases, e.g., kiln gases, are passed downwardly through the bed. The material is heated gradually, forming nodules. (to K. J. Sylvest; assigned to F. L. Smidth & Co.)

2,895,725—Improved construction for **cement** kilns or the like wherein the life of the refractory lining is extended by use of specially shaped metal shims to hold the refractory brick in place. The shims serve to preserve the rigidity and shape of the kiln structure, prevent or inhibit cracking of the lining, and minimize escape of heat through the kiln shell. (to F. J. Anderson; assigned to Monolith Portland Midwest Co.)

### Phosphate rock

2,890,934—Method for processing **phosphate rock** to precipitate dicalcium phosphate. The acid-rock digestion solution is treated with $CaCO_3$ in stages. (to R. Bart. Assigned to International Minerals & Chemical Corp.)

2,890,936—Process for digesting **phosphate rock** at a relatively rapid and uniform rate and with a high degree of extraction. Strong sulfuric acid is introduced directly into the digestion mixture at a number of spaced points. (to C. S. Benefield)

2,891,856—Process for making fertilizers from ammonia and impure wet-process phosphoric acid obtained by treating **phosphate rock** with dilute sulfuric acid. (to J. C. Getsinger and R. L. Haunschild. Assigned to Tennessee Valley Authority)

2,893,834—Improved method for defluorinating **phosphate rock** and calcium phosphates derived therefrom. Defluorination is accomplished during single or multiple-stage calcining using a gaseous medium in contact with the agitating solids. (to W. W. Richardson. Assigned to International Minerals & Chemicals Corp.)

2,893,858—Granulation of mixed fertilizers comprising KCl, nitrogen, and superphosphate derived from **phosphate rock.** (to R. A. MacDonald and T. H. Stewart. Assigned to International Minerals & Chemical Corp.)

2,894,809—In the recovery of phosphorous, aluminum, and uranium values from Florida pebble **phosphate rock** leached zone material, the ore is acidulated with sulfuric acid, and the reaction mass agitated and heated to 392 to 1,292 deg. F. The water-soluble reaction products are then leached out, and the leach solution treated for the various constituents. (to R. F. McCullough and J. B. Adams. Assigned to U.S. Atomic Energy Commission)

### Slag, blast-furnace

Canadian 579,681—To remove sulfur from **blast-furnace slag** being granulated, and thereby make the granular product more acceptable for use in concrete, the molten material in subdivided form is allowed to fall through an atmosphere of oxygen. (to E. Perryear; assigned to The British Oxygen of Canada Ltd., July 14, 1959)

*(Continued on page 170)*

*Copies of United States patents are available at a cost of 25 cents each (photostat copies of foreign patents at 30 cents per page) from The Commissioner of Patents, Washington 25, D.C. For convenience, coupons, each good for one copy of any patent, may be purchased from that official at the rate of $5.00 per 20-coupon pad or $25.00 per 100-coupon pad.

(Advertisement)

# How American Brake Shoe Maximates Production

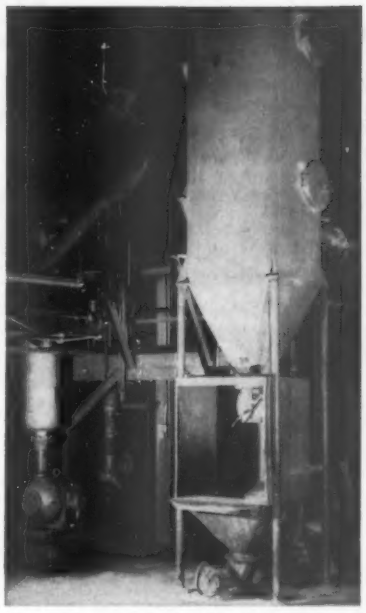
When the American Brake Shoe Company began an extensive modernization program at its New Castle, Delaware plant, one of the first steps management took to maximate production—that is achieve maximum output at less cost—was to install a Hoffman pneumatic conveying system for keeping bentonite, dextrin, silica flour and other materials *on the flow.* With a Hoffman exhauster furnishing the air as well as suction for the handling system, and use of components described here, the equipment not only simplified bulk conveying chores but paid its way in a few months by providing substantial production, material and labor savings.

## MATERIAL INTAKE VALVE

Materials are introduced into the air stream through a unique nonclogging intake valve attached to the bottom of a hopper and flow smoothly through pipe lines to any one of six primary cyclone storage tanks more than 350′ distant. Hoffman intake valves insure the uninterrupted flow of dry, powdery or granular materials through all types of vacuum conveying systems. Suitable for use with 2″ through 6″ pipelines, they are equipped with standard 8″ flanges and can be easily attached to bins, hoppers, or dust collectors. Connected equipment is protected from exposure to the full suction of the system by a separate air inlet. The material handling rate can be adjusted while air is flowing. Thorough mixing insures smooth transit.

## HINGE VALVE

Self-cleaning Hoffman hinge-type discharge valves are designed for air-tight closure against a head of material. The one-piece valve body is cast of gray iron with its rubber-faced disc and seat completely inside the casing. Lever linkage permits operation by means of chain or cable from a remote station. Provision can also be made for air or hydraulic cylinder actuation of the valve.



*A portion of the Hoffco-Veyor system installed at the American Brake Shoe Co. plant in New Castle, Delaware.*

## ROTARY VALVE

Chain driven rotary discharge valves of cast semi-steel construction feed the material in controlled quantities. Designed for interchangeability of various types of fabricated and cast rotors, valves are equipped with torque limiting drive sprockets for protection against jamming and overloading. Equalizing connections permit attachment of bleed lines to vacuum or pressure source. Inspection of the interior can be made through an access port without disassembly of the valve.

## PERISTALTIC VALVE

Controlled expansion and contraction of rubber diaphragms permit discharge in measured quantities. Since there are no internal moving parts, even coarse abrasives can be handled with minimum wear. Sheet rubber diaphragms are easily replaced whenever necessary.

## COMPETITIVE ADVANTAGES

In handling quantities of dry, free-flowing powdery and granular materials such as sand, shot, chemicals, etc., Hoffco-veyor systems and components speed production—provide many genuine benefits and advantages which are reflected in higher profit margins. These include:

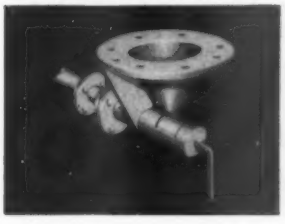
- flexibility
- easy installation
- cleanliness
- material saving
- time saving
- labor saving
- lower initial cost
- pay for themselves

## FREE ENGINEERING SERVICE

If you have a materials handling problem, you can solve it with either a complete Hoffman system or any of its parts which may be purchased separately to fit your needs. Available equipment includes dependable centrifugal blowers/exhausters, cyclones, collectors, material intake, hinge, rotary, butterfly and peristaltic valves as well as filter bag collectors. We'll be glad to make a free engineering survey to determine how you can improve your manufacturing methods by maximating production with a really tight method of material handling. Send now for a free descriptive booklet. Please write:

*Air Appliance Division*
*Dept. EM*
*U. S. Hoffman Machinery Corp.*
*103 Fourth Avenue*
*New York 3, New York*

*Material intake valve*



*Hinge valve*

*Rotary discharge valve*

*Peristaltic rubber valve*

Enter 1510 on Reader Card

## NEW PATENTS

*(Continued from page 168)*

### Silica sand

2,891,844—To remove impurities, particularly iron oxide films, from **silica sand** so as to render it suitable for making colorless glass, the sand is suspended in a solution of dilute sulfuric acid and a soluble inorganic chloride, such as NaCl, KCl, etc., and heated to 158 to 194 deg. F. While in contact with metallic copper having a large surface area. Iron from the sand goes into solution along with copper salts. The sands are separated from the solution and thoroughly washed with water. (to F. W. Adams. Assigned to Rockware Glass Ltd.)

### Fluorspar

2,891,293—A rigid, molded composition whose components react together exothermically in metal melts comprises **fluorspar,** bentonite or ball clay, and certain additional chemicals and metals. (to R. P. Forsythe. Assigned to Foundry Services Ltd.)

2,892,746—A flux composition for submerged melt welding is made by grinding a mixture of ferrosilicon, manganese ore, rutile and **fluorspar,** reacting the mixture, separating any reduced metallics, cooling the melt, and sizing the product. (to J. H. Brennan. Assigned to Union Carbide Corp.)

### Mineral wool

2,896,256—In an apparatus for manufacturing high-quality long-fiber **mineral wool,** the molten material is maintained at a proper temperature and viscosity throughout the entire fiberizing operation. (to M. S. Firnhaber; assigned to Sealtite Insulation Mfg. Corp.)

2,897,548—Mechanism and process for opening, removing shot and other non-fibrous masses, and applying a binder to **mineral wool** without excessive breaking and crushing of fibers. (to I. Barnett; assigned to Johns-Manville Corp.)

### Mica

Canadian 574,199—Separation and recovery of muscovite **mica** from mixtures thereof with biotite, for example, the mica silt at Davy Crockett Dam, Tenn. The mixture is deslimed, heated under mild reducing conditions to render the biotite selectively more magnetic than the muscovite, and subjected to magnetic separation methods to remove the muscovite from the biotite fraction. (to H. W. Adam; assigned to International Minerals & Chemical Corp., Apr. 14, 1959)

### Lime

Canadian 576,307—An improved plastic **lime** putty is made by subjecting an aqueous slurry of hydrated lime to a high rate of shearing action for a short period of time to increase the plasticity of the lime to at least 200. (to J. Erdley. Assigned to Gypsum, Lime & Alabastine, Canada, Ltd. May 19, 1959.)

### Gypsum

Canadian 579,285-6—Design for a rotary apparatus for agitating and calcining **gypsum.** The chamber has reentrant portions, and movement of the material therethrough breaks it into smaller pieces for efficient calcination. (to C. E. Compton, July 7, 1959)

### Sylvinite

Canadian 579,105—In a method for de-sliming **sylvinite** or like ores of clay prior to concentration of values therein, the ground ore is conditioned with a high molecular weight polymer of acrylamide and subjected to conventional froth flotation, the clay being separated in the froth. (to C. F. Williams; assigned to The Dow Chemical Co., July 7, 1959)

### Vermiculite

2,890,967—An asphalt coating composition comprises in the uncured state 40 to 60 percent air-blown asphalt, 30 to 40 percent solvent for said asphalt, 7 to 9 percent exfoliated **vermiculite,** and 13 to 21 percent short asbestos fiber. This material is especially suitable for application over high-temperature insulation, walls, etc., where exposed to the weather. (to A. J. Hoiberg and C. E. Cowger. Assigned to Monsanto Chemical Co.)

### Kaolin

Canadian 577,975—In the preparation of petroleum contact catalysts, kaolin is acid treated and aged, and the resulting aluminum sulfate partially removed. The material is then sprayed into a heated bath of white mineral oil to form discrete microspheres, which are separated from the oil and calcined at 900-1600 deg. F. (to M. J. Powell and A. J. Robinson; assigned to Minerals & Chemicals Corp. of America, June 16, 1959)

Canadian 577,992—Prior to the preparation of **kaolin** petroleum catalysts in accordance with the acid-aging-oil bath method described in Canadian Patent No. 577,975 the white mineral oil is repeatedly contacted with mixtures of kaolin and concentrated sulfuric acid. (to A. H. Pedler; assigned to Minerals & Chemicals Corp. of America, June 16, 1959)

### Magnesite

2,898,194—In a method for recovering CaO-free magnesia from natural **magnesite,** the crushed ore is calcined at 1300-1650 deg. F., and the calcine hydrated with steam or water and then sized into a finer fraction of hydrated magnesite and a coarse fraction of silicates, dolomite, and calcite. (to H. P. Eells, Jr., E. P. Pearson and H. C. Lee; assigned to Basic Inc.)

### Roofing granules

2,898,232—Process for making high-quality colored **roofing granules.** The water-soluble byproducts of chemical insolubilization are removed from the granules inexpensively and without loss of color. (to R. M. Miller, J. R. Lodge and M. C. Merwin; assigned to Minnesota Mining & Mfg. Co.)

### Miscellaneous

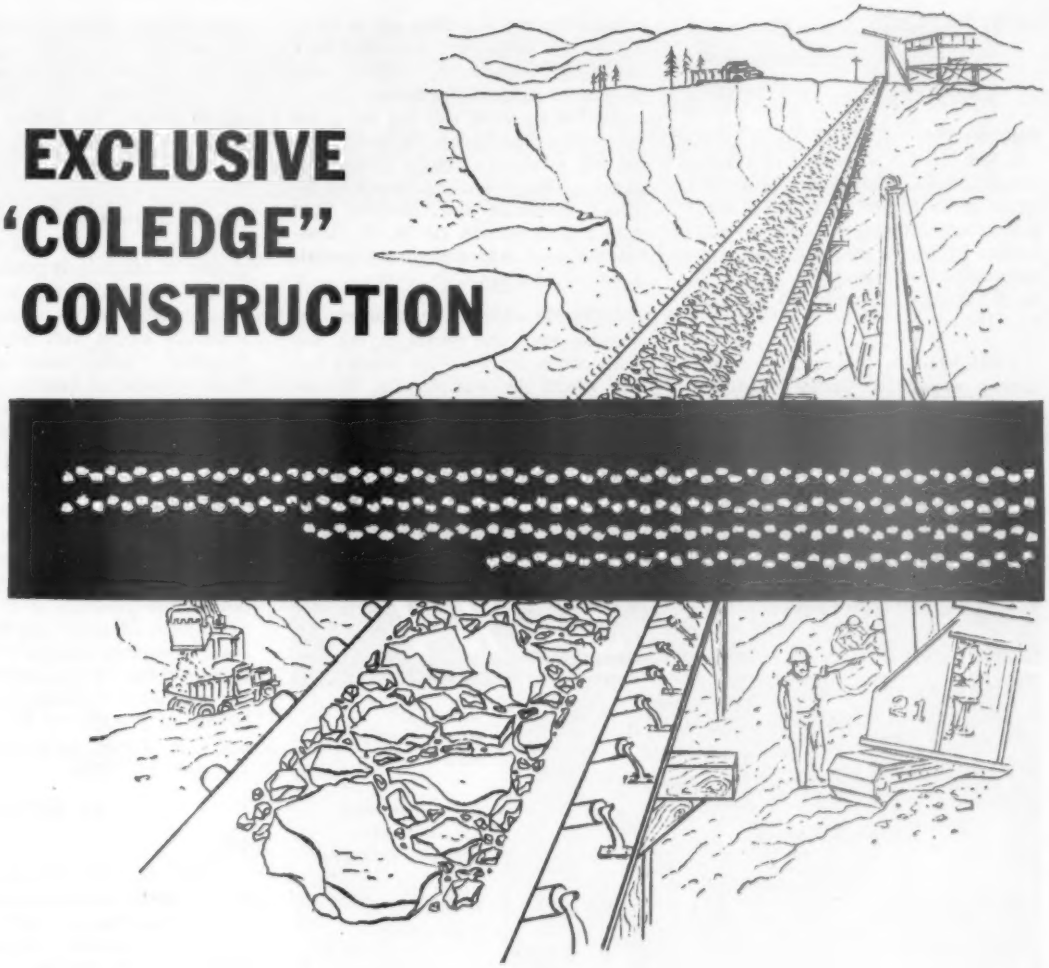
2,886,414—Process for making a finely divided silica product from **diatomite, quartz, tripoli,** siliceous **fluorspar,** etc. (to R. N. Secord; assigned to Godfrey L. Cabot, Inc.)

2,889,042—Method of concentrating values in ores of **phosphate rock, sylvinite, langbeinite, feldspar, fluorspar, barite,** etc. The different components of the ore are caused to accept differential electrical charges, and separated electrostatically. (to I. M. Le Baron; assigned to International Minerals & Chemical Corp.)

2,890,126-7 and 2,890,173—Use of **feldspar, silica sand,** and **kyanite** in the manufacture of a cellular silica product. (to W. D. Ford; assigned to Pittsburgh Corning Corp.)

*(Continued on page 172)*

# EXCLUSIVE "COLEDGE" CONSTRUCTION



## Quaker Thermoid gives Thermoid Conveyor Belting extra life where it counts

Punishment at the edges—especially the tough use dealt out in quarrying—can kill most conveyor belting in a fraction of the time that Thermoid-Quaker Conveyor Belting lasts. The unique "COLEDGE", though, available on all grades of Thermoid-Quaker Conveyor Belting, puts more rubber where it's needed, makes a more flexible and wear-resistant edge where the abrasion is greatest. Tests show Thermoid-Quaker Belting with "COLEDGE" construction lasts and lasts on the same jobs where other belting fails.

What's more, all Thermoid-Quaker Conveyor Belting is *prestressed* in manufacture, so that the belt is actually in compression when you get it—ready for the heaviest load without strain.

Examine Thermoid-Quaker Conveyor Belting with the exclusive "COLEDGE" construction at your Thermoid distributor's, or write for further information to *Thermoid Division, H. K. Porter Company, Inc., Tacony & Comly Sts., Philadelphia 24, Pa.*

THERMOID DIVISION **PORTER** H.K. PORTER COMPANY, INC.

**PORTER SERVES INDUSTRY:** with Rubber and Friction Products—THERMOID DIVISION; Electrical Equipment—DELTA-STAR ELECTRIC DIVISION, NATIONAL ELECTRIC DIVISION; Specialty Alloys—RIVERSIDE-ALLOY METAL DIVISION; Refractories—REFRACTORIES DIVISION; Electric Furnace Steel—CONNORS STEEL DIVISION, VULCAN-KIDD STEEL DIVISION; Fabricated Products—DISSTON DIVISION, FORGE AND FITTINGS DIVISION, LESCHEN WIRE ROPE DIVISION, MOULDINGS DIVISION, H. K. PORTER COMPANY de MEXICO S. A.; and in Canada, Refractories, "Disston" Tools, "Federal" Wires and Cables, "Nepcoduct" Systems—H. K. PORTER COMPANY (CANADA) LTD

*Enter 1489 on Reader Card*

## NEW PATENTS

*(Continued from page 170)*

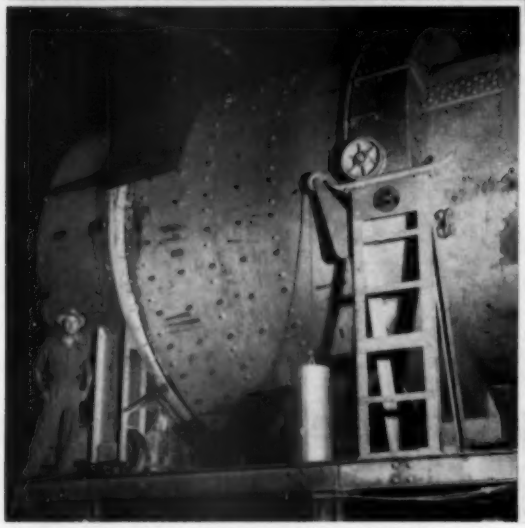
### Aggregates

2,898,223—In a method of coating **crushed stone, sand, gravel,** and other types of aggregate to make a high-grade road surfacing material, a water-soluble barium or strontium salt is incorporated in the usual tar binder. (to R. S. Detrick; assigned to Koppers Co., Inc.)

2,898,303—In a method for producing expanded **perlite** especially suitable for use as a filter aid or filler, the ground perlite ore is treated with dilute hydrochloric or sulfuric acid prior to expansion. Ore so treated will expand at a greater rate for any given temperature, and upon abrasive grinding will produce a greater percentage of fines. The product has improved filtration properties and enhanced light reflecting properties. (to H. H. Houston; assigned to International Minerals & Chemical Corp.)

2,899,070—Design for a simple but effective **sand** and **gravel** drying machine consisting of a tilted rotating pan into which the wet material is continuously fed. Water is squeezed from the material by a number of baffles. The dried product is forced over one side of the pan, while water is removed below the baffles. (to J. T. Murphy)


**MANITOWOC Recuperators**
**Can Increase Rotary Kiln Output Up to 30%!**



- ★ *Rapid air quenching and cooling*
- ★ *Instantaneous ignition of air-fuel mixture*
- ★ *Increased production*
- ★ *Highest heat exchange efficiency*
- ★ *Greatly improved grindability*
- ★ *Substantial fuel savings*

Manitowoc Type S Recuperator mounted on unit-fired kiln 11' x 400'.

Here's why Manitowoc Recuperators have improved rotary cement kiln performance in numerous world-wide installations:
1. The active cooling surface is engineered into the smallest possible area, allowing the cooling air to contact the clinker before it has begun to chill. 2. Pre-heated air travels the shortest possible distance, reducing heat loss. 3. Heat loss through radiation is almost eliminated. 4. Pre-heated secondary air volume contacts the primary air-fuel mixture in a highly turbulent condition, assuring instant ignition.

*See how Manitowoc Recuperators will increase your kiln output. Write today for this informative catalog.*

**MANITOWOC SHIPBUILDING, INC.,** *Manitowoc, Wis.*
*(A subsidiary of The Manitowoc Company, Inc.)*

*Enter 1454 on Reader Card*


### Phosphate rock

Canadian 579,097—In the disintegration of uncalcined crude **phosphate rock** with nitric acid, a series of vessels is used. Portions of digestion material are mixed with more acid and re-cycled to initial vessels in the series. Fresh rock is fed continuously to the initial vessels. (to F. Brandt, H. Nees and K. Liebrecht; assigned to Chemische Fabrik Kalk G.m.b.H., July 7, 1959)

Canadian 579,334—In the recovery of phosphate values from **phosphate rock,** the ground ore is subjected to tabling, classification, or froth flotation in the presence of a mixture of equal parts of water and black liquor soap skimmings having a solids content of about 35 percent. The pH of the mixture is maintained at 9.5-12.5 by use of NaOH. (to W. A. Hodges and J. E. Floyd; assigned to Swift & Co., July 14, 1959)

### Clay

2,892,731—Use of refined plus-2 micron **kaolin** in starch and starch derivative, dextrine, or polyhydric alcohol base adhesives, particularly adhesives suitable for use in the manufacture of corrugated board. (to A. W. Claxton. Assigned to Minerals & Chemicals Corp. of America.)

2,892,800—Two-step acid treatment for making an **activated clay,** suitable for the percolation of oils, from crude, low-swelling **bentonite.** The clay is first treated with HCl and then with $H_2SO_4$. (to G. Taipale. Assigned to American Silicate Co., Inc.)

2,894,628—In a process for improving the brightness of **kaolin** to make it useful as an extender pigment in white and pastel paints, particularly flat wall paints, the kaolin is dispersed with sodium carbonate or sodium silicate and subjected to froth flotation instead of the usual bleaching, or prior to such bleaching. A negatitve-ion reagent, such as tall oil or red oil, and an auxiliary agent from the group consisting of ammonium sulfate, magnesium sulfate, and potassium sulfate are used. The colored impurities are floated in a froth, which is sent to waste. (to J. B. Duke. Assigned to Minerals & Chemicals Corp. of America)

*(Continued on page 174)*

From Aggregates...to cement...to Zinc sulfate

# Dorsey Bulkmaster Transports deliver more payload...faster

WHATEVER YOUR dry bulk cargo may be, these new Dorsey Bulkmasters are designed to *cut delivery time and costs.* So efficient they make light work of stubborn cargoes, and ruggedly engineered with quality features that insure long, trouble-free operation. Check the specifications of each model . . . decide which best suits *your needs* . . . and see your Dorsey Distributor today!

**MODEL BMC-T** For high speed and efficiency, the BMC-T features new two-stage drives that permit discharge of the rear portion of the load before the front screws are engaged. Screws are reversible to dislodge lumps and to assist air pads in eliminating bridging. The unit operates from the tractor P.T.O. through a tandem hydraulic pump and discharges five barrels per minute. Three 20" fill hatches with water-tight covers and single point downspout with rubberized nylon discharge boot are standard. A wide range of capacities and lengths as well as other "custom" features are available without price penalty.

**MODEL FB-T** This versatile performer pit dumps or can be equipped with 14-foot folding or rigid full-swiveling 18"-wide endless-belt conveyor. Tandem hydraulic pump, powered by a 25-hp air-cooled gasoline engine, operates rubber belt conveyor, which is riveted to a 36" heavy-duty steel conveyor chain, and elevators. The FB-T discharges in excess of a ton a minute. All-steel, electrically-welded body is equipped with heavy-duty tarpaulin and bows. A wide choice of options is available.

**BOTTOM DUMP TRAILERS** Your Dorsey Distributor now offers a complete line of open and closed top hopper trailers and trains for transporting cement, aggregate or any dry bulk material. The model illustrated has high-clearance doors giving a very heavy discharge pattern and also features a sturdy projecting rear bumper for pushing. Steep slope sides prevent load packing and there is no bracing inside hopper.

*For more information on the newest in self-unloading transports see your Dorsey Distributor today, or MAIL THE COUPON*

DORSEY

**DORSEY TRAILERS / ELBA, ALABAMA**

A Subsidiary of the Dorsey Corporation

**Dorsey Trailers / Elba, Alabama** RP

RUSH literature on

____Model BMC-T ____Model FB-T ____Hopper Trailers

Name_____

Company_____

Address_____

City and State_____

*Enter 1502 on Reader Card*

## NEW PATENTS

*(Continued from page 172)*

**Spodumene**

2,893,828—In the production of water-soluble lithium compounds from lithium-bearing silicates, ground **spodumene** ore is mixed with optimum proportions of ground KCl or sylvinite and silica or other refractory material, and the mitxure heated at 1,796 to 2,012 deg. F. until substantially all of the lithium has been converted to lithium chloride. The mixture is then cooled and the lithium chloride leached therefrom. The resulting residue is economical and suitable for use as the refractory material in the processing of additional ore. (to J. A. Peterson and G. H. Gloss. Assigned to International Minerals & Chemical Corp.)

**Lime**

2,888,324—Design for an apparatus and related method particularly suited for the hydration of dolomitic quick **lime,** and useful also in the hydration of calcitic quick lime. The quick lime is fed continuously into a mixing zone where it is mixed with an excess of hot water, and the mixture then passed into and through an elongated drying zone. The process is operative at ordinary atmospheric pressures and achieves better than 98% hydration. (to A. R. Allen; assigned to Kennedy-Van Saun Mfg. & Eng. Corp.)

2,889,143—Design for a novel fluid-cooled preheater for **lime** kilns. (to W. A. Reaney and D. W. Reaney)

**Clays**

2,895,873—Method of preparing from **attapulgite** a granular, sorptive animal litter. Calcined attapulgite is treated with sulfuric acid, and the acid-treated material calcined at 850-950 deg. F., cooled several hours, and impregnated with an onium-type nitrogen germicide. (to E. W. Sawyer, Jr., and W. W. Gary; assigned to Minerals & Chemicals Corp. of America)

2,896,280—Use of Western **bentonite** in an adhesive composition employed in the forming of molds and cores for the preparation of metal casting forms. (to F. P. Ilenda and J. C. Noyes; assigned to Diamond Alkali Co.)

2,897,043—Use of colloidal **bentonite** in the scouring of raw wool. (to W. Fong; assigned to U. S. Dept. of Agriculture)

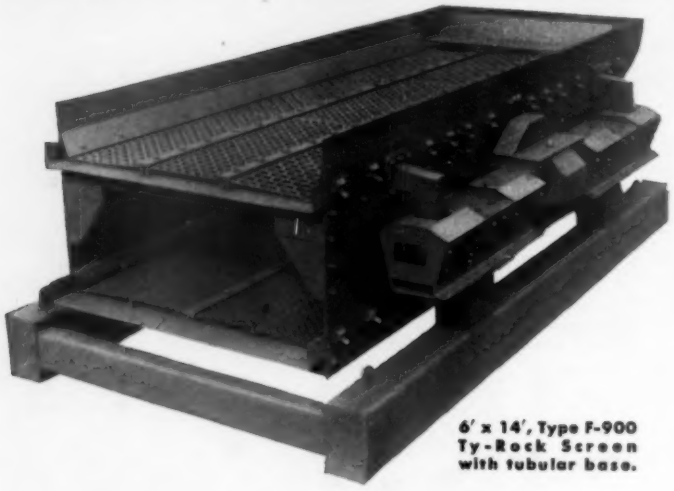
2,898,253—Use of swelling **bentonite** in a metal coating composition of the cermet type. (to E. B. Schneider and E. G. Stevens; assigned to North American Aviation Inc.)

2,898,270—In the treatment of barley malt, a swelling and gelling clay, particularly San Bernardino County, Calif., **hectorite,** is added as an adsorbent for color and odors. (to P. R. Witt, Jr., and R. G. Shaler; one-half each assigned to The Inerto Co. and Northwestern Malt & Grain Co.)

2,898,304—Method for acid activation of **kaolin** to produce an adsorptive petroleum contact material in the form of hard, spherical particles. The kaolin is treated with acid, dispersed in white mineral oil, and thereafter calcined. (to M. J. Powell and T. A. Cecil; assigned to Minerals & Chemicals Corp. of America)

2,898,759—To seal a leak in a basement wall, the earth is forced out from the leak, using a wedge-shaped tool. The cavity is filled with dry, swellable **bentonite,** after which the tool is removed and the earth is permitted to settle against the bentonite. (to V. H. Pebley) END


# TY-ROCK SCREENS



6' x 14', Type F-900 Ty-Rock Screen with tubular base.

## For TOP Performance

The balanced circle-throw action of the Ty-Rock plus the full-floating action on large shear type resilient rubbers enables this screen to separate material with unequalled speed and effectiveness.

The Ty-Rock wastes no power in useless, harmful racking of buildings or supporting members. It delivers all of the intense power to the job of stratifying and separating the sizes.

*Telephone* HE 1-5400 • *Teletype* CV 586

**THE W. S. TYLER COMPANY**
CLEVELAND 14, OHIO
Manufacturers of Woven Wire Screens and Screening Machinery

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# Need grinding balls in a hurry?

**CONTACT UNITED STATES STEEL!** If all of a sudden you find you're caught short on grinding balls, you can get them fast from United States Steel. For example, a company in West Virginia needed 40,000 pounds of 1½-inch diameter grinding balls in a hurry. They requested delivery "as soon as possible." The order was entered by our Baltimore Sales Office and *shipped the following day.*

Though most companies place orders for grinding balls two to three months in advance, there are always emergencies . . . and United States Steel is ready to help you out when that emergency comes up. A complete stock of USS Carbon-Manganese Steel and USS Alloy Steel Grinding Balls is maintained at all times.

We can ship grinding balls almost any way you like: In 100-pound capacity burlap bags; in 2,000-pound capacity steel drums; in semi-trailer or dump trucks; in gondola or box cars (loose or in containers); or you can send your own truck if you like. The next time you need grinding balls contact the United States Steel Sales Office nearest you, or write or call United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

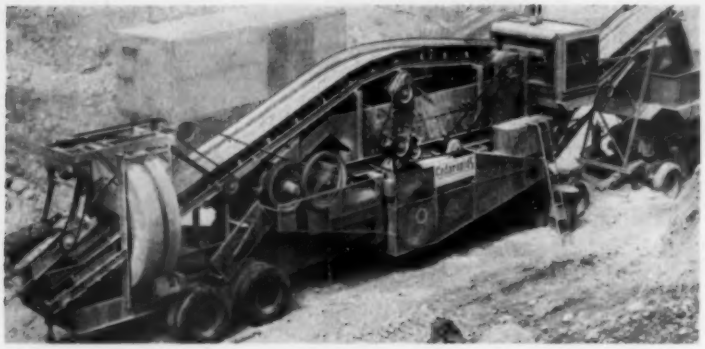
*USS is a registered trademark*

USS

United States Steel Corporation – Pittsburgh
Columbia-Geneva Steel – San Francisco
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Export Company

**United States Steel**

# NEW MACHINERY



## Super-size crushing, screening plant provides portability

A LARGE NEW PORTABLE crushing and screening plant—with a capacity up to 500 tph. and as many as four product sizes — has completed six months of field testing. Known as the Super Commander, the machine incorporates a 12 x 36-in. twin jaw crusher to give nearly 100 percent more primary crushing capacity and a 4 x 14-ft. triple deck vibrating screen to yield 40 percent more screening capacity over smaller units in this manufacturer's line. Other components have been scaled larger to maintain balanced capacity.

The larger unit does not sacrifice portability. It is mounted on tandem axles, but if necessary a third air-suspension axle can be added to reduce axle load to less than 18,000 lb. Weight on each of the three axles can be reduced still more if the feed hopper and feeder is removed.

In addition to greater capacity the machine includes a number of optional features which increase its usefulness and efficiency. A prescreening attachment is available to enable the plant to make 100 percent crushed material. Washed aggregates can be produced with a spray bar attachment, and a screw conveyor can be added to handle wet or dry fines. Drive units have been simplified and belt wipers have been added to improve the design of these small but vital details. *Iowa Mfg. Co., Cedar Rapids, Iowa*

**Enter 300 on Reader Card**

## Fabricated wires for semi-automatic resurfacing

A COMPLETE NEW LINE of tubular wires for semi-automatic resurfacing with any semi-automatic welding unit is being announced. These fabricated tubular wires contain alloys for application through conventional semi-automatic welders which automatically feed the wire when the arc is struck. They can be applied with either the open arc or submerged arc process. Any type welding machine of sufficient capacity to handle the high weld deposition rate and high duty cycle may be used as a power source; usually a 300 amp. or larger welder.

The wires are 7/64-in. diam. and are supplied in 50-lb. coils. The new wires and their physical characteristics are: HB-90, C-50 Rockwell hardness, good resistance to abrasion, impact and corrosion, excellent abrasion resistance when cold; HB-4560, C-45 Rockwell hardness, for heavy-duty build-up with good abrasion resistance; and HB Nimang, Rockwell hardness B-85 to 90 (deposited) C-40 to 45 (work hardened), for build-up and joining manganese steel parts. *Hobart Brothers Co., Troy, Ohio*

**Enter 301 on Reader Card**

## High speed drill

"PUSH-BUTTON" hydraulic power positioning of the drill mast, and increasing the drilling rate two to three times. are features of a new self-propelled tractor-type rock drilling rig now available.

Finger-tip movement of five levers on the new unit, the TR-5 crawler rig. enables the operator to power position the drill mast through 10 hydraulic movements. This permits swinging. sliding, raising, and lowering of the

mast to any conceivable position to meet any vertical, horizontal, or angular drilling requirement.

The unit is equipped standard with a 4½-in. bore drifter, a power-feed mast for 10-ft. steel changes, and a self-propelled tractor-type chassis driven by compact new 8-hp. twin air motors.

During extensive field tests of pilot models of the new TR-5 crawler drill, were recorded rates up to 1 fpm. in putting down 3⅓-in. diam. holes 40 ft. deep in hard limestone, according to the maker. *Thor Power Tool Co., 175 N. State St., Aurora, Ill.*

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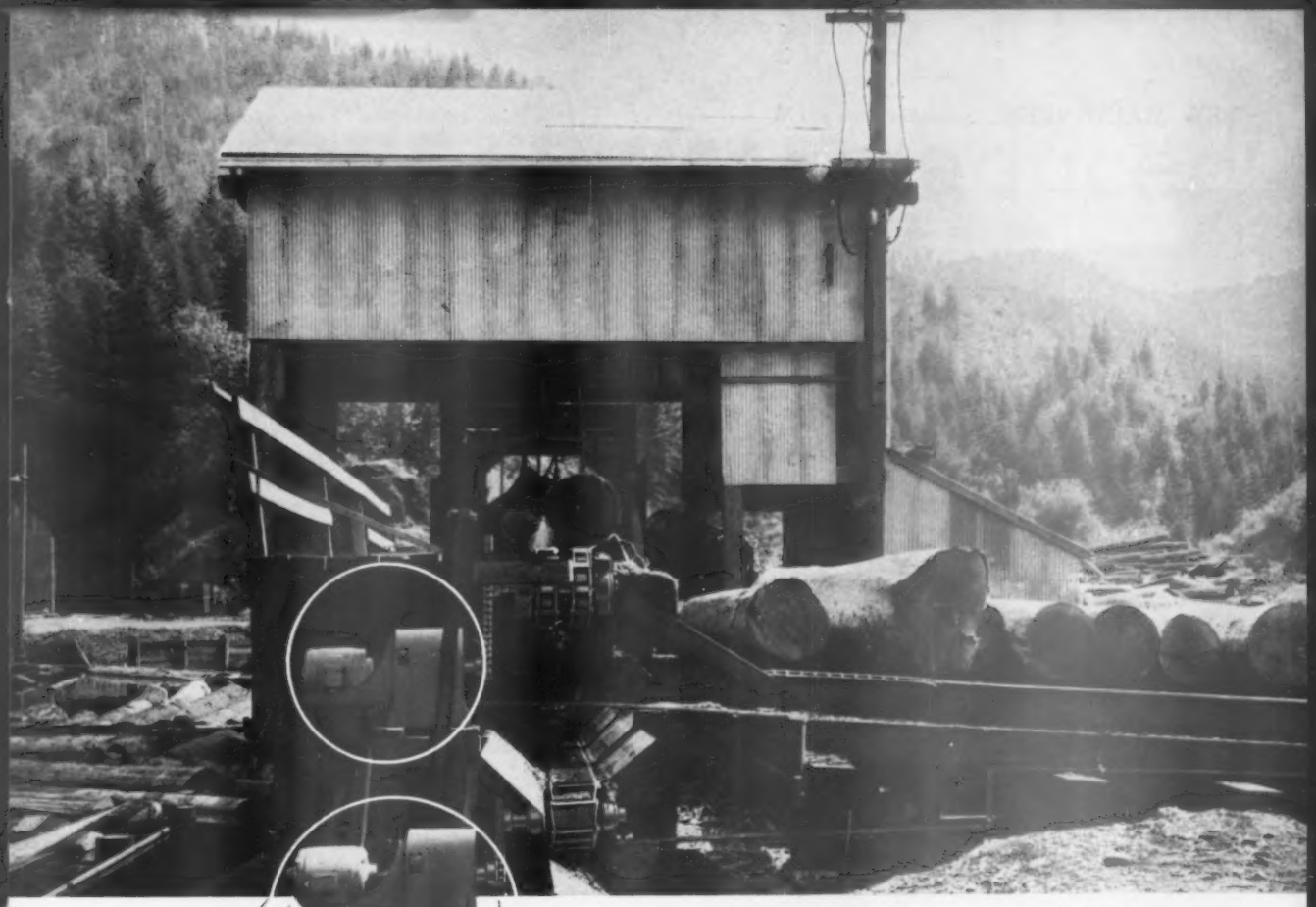
*(Continued on page 178)*



**Enter 1465 on Reader Card**



FALK Motoreducers driving log conveyor and refuse conveyor at the modern mill of The Bohemia Lumber Company, Culp Creek, Oregon.

# FALK *all-steel* Motoreducers give you longer service life

Whether your load conditions are normal or heavy, the extra rigidity of all-steel construction (more than twice that of cast iron) maintains better alignment of revolving elements under load...a vital factor in prolonging the service life of gears and bearings.

And if your installations are subject to shock loads, or accidental external impacts, you're way ahead when you install Falk All-Steel Motoreducers. These rugged units do not destroy themselves by tearing off their feet under jamming overloads, nor are their housings subject to cracks which both dissipate the vital lubricant supply and allow revolving elements to get out of alignment.

All-steel construction is one of the built-in extras that you get in Falk Motoreducers. Others include: (1) 12 to 15% reserve load-carrying capacity in the gears (by AGMA standards), thanks to exclusive Falk extra-depth, high pressure angle helical gears; (2) maximum mechanical efficiency (98½% per gear mesh, under full load); (3) your choice of standard units (horizontal, vertical or right angle) to fit your precise requirements.

**HORSEPOWER RANGE: to 75 hp . . . STANDARD OUTPUT SPEEDS: 780 rpm (high) to 1.2 rpm (low).**

Prompt delivery from distributor stocks, or from warehouse or factory. Ask your Falk Representative or Authorized Falk Distributor for ***Bulletin 3100.***

**THE FALK CORPORATION, MILWAUKEE 1, WIS.**

*MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS*

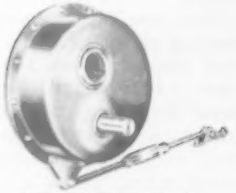
**Representatives and Distributors in most principal cities**

**FALK**

...a good name in industry

**Take your choice of all-steel drives when you specify Falk**

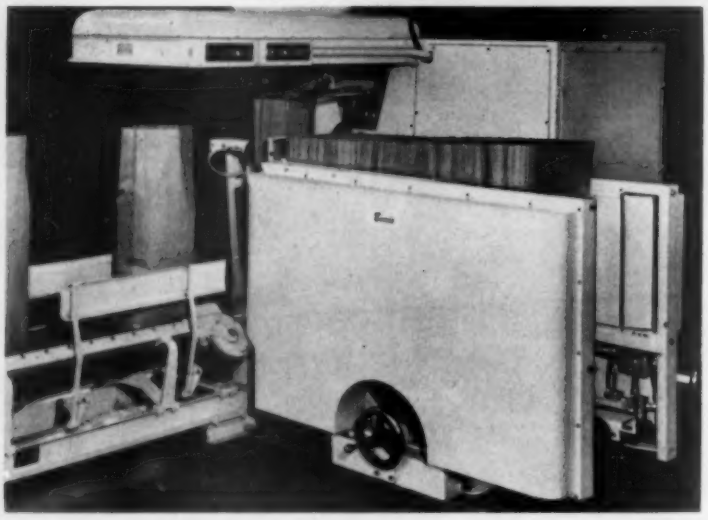
**THE FALK ALL-MOTOR MOTOREDUCER**
**...the original All-Motor unit**



**THE ALL-STEEL FALK SHAFT MOUNTED DRIVE**

**Torque ratings to 41,000 lb-in at low speed shaft. Also available in flange-mount design.**

FALK and ALL-MOTOR are Registered Trademarks.



## Automatic, open-mouth, multi-wall bag feeder

THE FIRST EFFICIENT and fully operational automatic open-mouth multiwall bag feeder has been announced. The manufacturer states that it will operate at speeds of 16 bags per minute, 50 lb. and heavier, and at even higher speeds with some free-flowing products with ample bin supply systems. The Auto-Mac multiwall bag feeder handles a wide range of bag dimensions. It is equipped with an easy-loading magazine which holds a large supply of bags.

The unit is furnished with a new control system for simplicity of operation—a switch to activate the cycling operation and individual controls to regulate speed. No special training is required to maintain the ruggedly built unit. One handwheel, located on the side of the unit, adjusts the bag width and a rear handwheel the bag length. No other adjustments are necessary. *Bemis Bro. Bag Co., 305 27th Ave., N.E., Minneapolis 18, Minn.*

**Enter 303 on Reader Card**

## New washing plant designed for easy mobility

A LINE OF WASHING PLANTS, featuring a newly developed principle of washing and screening, has just been announced. Designed to meet the need for a washing plant that would be easy to erect, easy to move and easy to adapt to changing pit conditions, the new line of Hydro-Screen plants includes several different models, all evolving from a single basic design.

This basic plant consists of a reciprocating plate feeder, conveyor, step-deck vibrating screen and screw classifier, with necessary structural supports. Three series of this basic plant are available, determined by size of plant components. Optional units, designed to meet specific aggregate washing problems, can be integrated.

The washing screen itself is reported to be a unique combination of high pressure spray bars on all three decks of the screen, a step-deck arrangement of the second screen deck which cascades material through the water sprays, and circle throw of the screen frame to wash and screen fast and clean. The manufacturer claims that the Hydro-Screen principle is so effective that screen capacity is two to three times greater than that of a dry screen. *Pioneer Engineering Div. of Poor & Co., Inc., Minneapolis 14, Minnesota*

**Enter 304 on Reader Card**

## Closed circuit TV line

TO MARK A CHICAGO FIRM'S entrance into the industrial and educational television field, a line of five closed circuit television cameras and two monitors will be available.

The basic general purpose camera is a high quality, highly sensitive and stable instrument, providing 550-600 lines horizontal resolution. Weighing 12 lb. and measuring 5½ x 7 x 11 in., the camera puts out a one volt video signal into a 75 ohm coaxial cable. The camera uses a standard 16 mm. C lens mount and can accommodate a remote control four lens turret. Such remotely controlled functions as pan and tilt, iris control, focus and zoom lens can also be added to the camera.

The industrial monitor, or receiver, has a 14-in. screen. Ruggedly constructed, it provides high brightness, 600 line resolution and excellent stability. When used with the locked interlace camera, it enables optimum interlace of horizontal and vertical fields.

Included in the new line are complete selections of mounting, optical and distribution accessories to meet all application requirements. The maker will provide a complete system design, engineering and maintenance service along with its equipment. *Motorola, Inc., 4501 W. Augusta Blvd., Chicago 5, Ill.*

**Enter 305 on Reader Card**

## Speed reducer

A GIANT SHAFT-MOUNTED speed reducer has been added to this manufacturer's line. Described as the world's largest shaft-mounted reducer, it is available from stock in both 15 to 1 and 25 to 1 ratios in identical housings. Known as the Model TD 11, the new unit has a rating of 154 hp. at 75 rpm.—maximum recommended output speed for the 24.73 to 1 ratio. This huge unit is an extension of a redesigned group of shaft-mounted reducers. Improvements in the line include a new technique for attaching the torque arm to the reducer housing and a new saddle bracket for improved balance of the units in overhung applications. *Dodge Mfg. Corp., Mishawaka, Ind.*

**Enter 306 on Reader Card**

## Long patches to repair conveyor belts

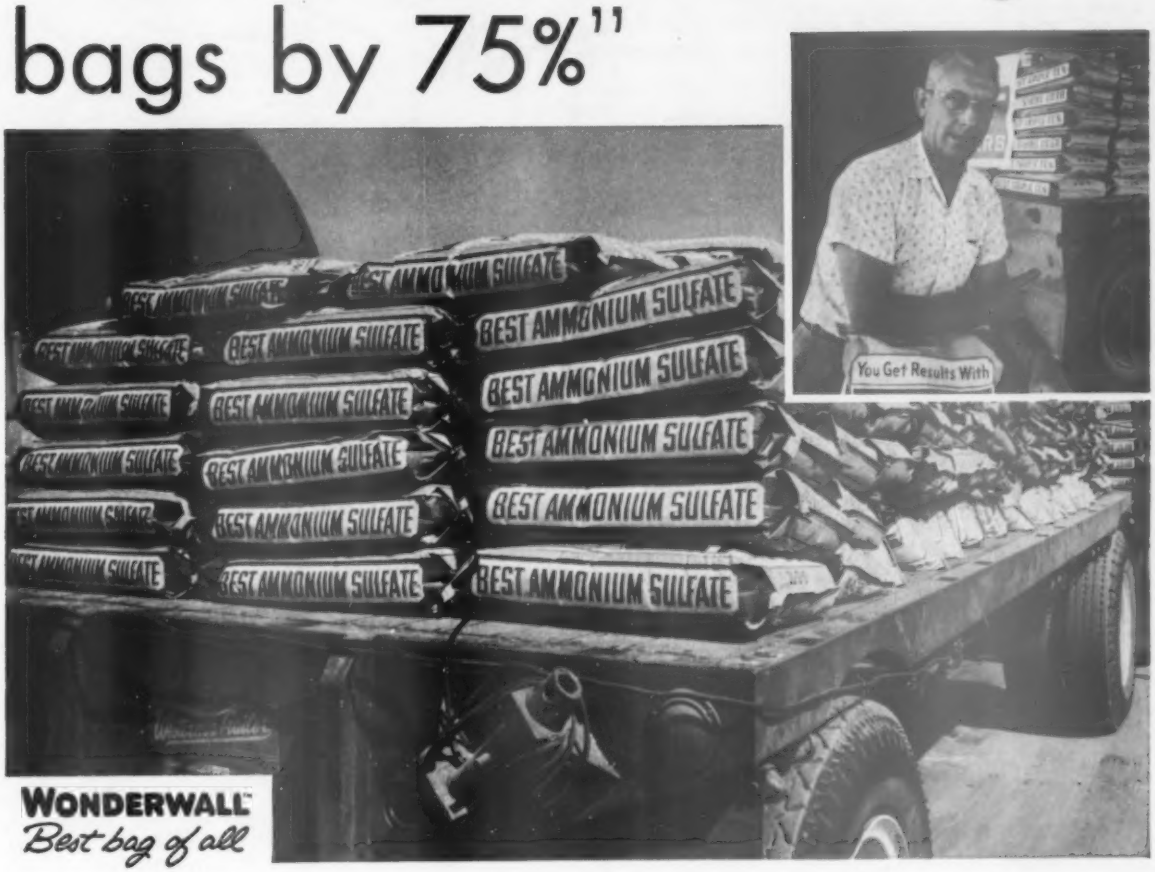
TO MEET THE long-standing need for long material patches suitable to repair frayed or injured edges on conveyor belts, this manufacturer has added Long Patches to its line of belt repair material.

The new Long Patches have feathered thin edges and come in 1⅝ in. wide x 20 in. long and 3⅜ in. wide x 20 in. long strips. Like all other chemically cold self-vulcanizing repair material in the line, they require no heat and no equipment and cure at low temperature. They provide a fast, easy and efficient method of making conveyor belt repairs. *Automatic Vulcanizers Corp., 16 Hudson St., New York 13, N.Y.*

**Enter 307 on Reader Card**

*(Continued on page 180)*

# "WONDERWALL™ reduced our losses from damaged bags by 75%"




"Losses caused by damaged bags have been reduced by at least 75% since we started shipping our twelve different formulas of ammonia phosphate and sulfate fertilizers in WONDERWALL bags," says Mr. Alfred G. Roecks, assistant plant manager at the Best Fertilizers Company, Lathrop, California.

The Best Company packs 80# of fertilizer in a sewn valve bag, 15" x 4½" x 32½". The old 4-ply natural kraft bag they used was 1/40, 2/50, 1/60, totaling 200# basis weight. The 3-ply WONDERWALL bag they are now using is 2/50, 1/70, totaling 170#. These bags—15% lighter—have proved to be *stronger* than their previous 4-ply bags!

WONDERWALL is West Virginia's new, tougher multiwall that outperforms ordinary bags because it's made of Kraftsman Clupak* paper. This extraordinary paper stretches and withstands punishment that breaks ordinary kraft. Best now plans to use bags made from Clupak extensible paper exclusively.

Besides obtaining reduced breakage, many companies packing fertilizers, feed, cement, chemicals and similar products are also achieving substantial *bag cost savings* through use of the lighter, tougher WONDERWALL bags.

Let a West Virginia representative show you how *you* can cut bag costs and reduce breakage. Write or call Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Avenue, New York 17, New York.

**Clupak, Inc.'s trademark for extensible paper, manufactured under its authority.*

**West Virginia Pulp and Paper**

*Enter 1417 on Reader Card*

(Continued from page 178)

## Heavy-duty vibrating feeder

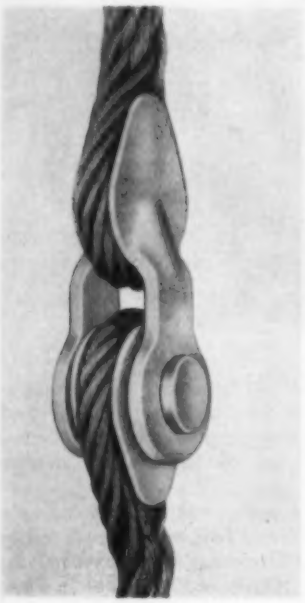
A NEW HEAVY-DUTY feeder has been added to this manufacturer's extensive line of electric and mechanical vibrating units. Known as the No. 6-D, it was designed for the heaviest kind of duty. With a capacity up to 1,000 tons per hour, it is ideal for feeding controlled tonnages of material from bins to belts, crushers, pulverizers, kilns, grinding mills, scales and other processing equipment.

The No. 6-D is equipped with 60 x 90-in. open pan deck and renewable wear resisting liner. It can be furnished with various deck styles, enclosed pan, tubular, grizzly top or with spreader-type deck. *Jeffrey Mfg. Co., Columbus, Ohio*

**Enter 308 on Reader Card**

## Forged fittings

FIRST UNITS in a line of drop forged wire rope pendant fittings are now available. The manufacturer claims that forgings give the safest connections for boom pendants, and that the one piece steel forgings have been extensively field-tested by a major maker of cranes and shovels. The new fittings are interchangeable with standard wire rope sockets. One-in. open and closed fittings are now available from stock with other sizes to be available in the near future. *Sherman & Reilly, Inc., Chattanooga 2, Tenn.*



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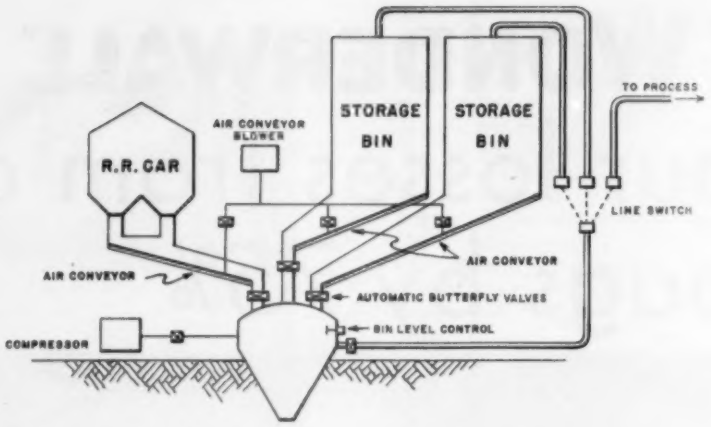



## High-pressure conveying for abrasive minerals

A COMPLETELY NEW, proven concept of air conveying is available for products that are abrasive to rotary-type conveying valves. This new system is designed for cement, ground limestone, drilling mud and other abrasive mineral products.

The system is built around a pressure vessel that is ASME-coded for high pressures. Material is introduced into the vessel from railroad cars, trucks, or bins, by air chute, screw or other conveyor. The vessel is then sealed, using manual or automatic butterfly valves, and pressurized from an air compressor unit. When the pressure is sufficient, the vessel discharge valve is opened, and material is discharged at very high rates into a storage bin or use point. The filling and discharge cycle is then repeated. This cycle can be manually or automatically controlled as desired.

Outstanding advantages claimed for the system are: 1. high capacity; 2. low air volume required, resulting in a very high product-to-air ratio; 3. no close clearance moving parts in contact with the product, eliminating abrasion problems; 4. low system cost; 5. complete system flexibility. *Systems Engineering and Manufacturing Co., Inc., P.O. Box 7634, Houston 7, Texas*

**Enter 310 on Reader Card**

## Non-blinding, loose-rod screen deck

A LOOSE ROD DECK which can screen moist, sticky rock, ores and clayey materials without blinding has been introduced. It is available for both new and existing vibrating screens. Comprised of free-rolling loose rods which rotate as they vibrate, the new deck greatly increases production with reduced costs.

The loose deck rods have induction-hardened ends to resist wear and abrasion. Installed at right angles to material flow in contrast to conventional fixed rod deck designs, the rods are held in place and accurately spaced by heat-treated, alloy steel spacers. Replacement, singly or in groups, is easy.

Rods rotate opposite to the rotation of the vibrating mechanism at 60 to 100 rpm. depending upon screen throw and speed. In handling ores, wet fines adhere to the rods, thereby providing a thin protective coating which reduces the clear opening between them. The smaller openings, combined with rotation and secondary vibration of the rods, screen slope and screen throw, result in a finer separation than possible with other types of screen surfaces, according to the maker. *Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.*

**Enter 311 on Reader Card**

## Dragline buckets

A COMPLETELY NEW line of economical dragline buckets for light and general purpose service, including levee and swamp work, irrigation ditching and sand and gravel operations has been announced.

Known as Williams type "DC" draglines, the new models are available in sizes ⅜ through 1 cu. yd. with or without perforations. *Williams Bucket Div., The Wellman Engineering Co., 113 St. Clair Ave., N.E., Cleveland 14, Ohio*

**Enter 312 on Reader Card**

(Continued on page 182)

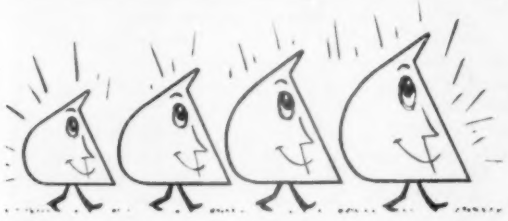
# When is a 2-yd Loader *Not a 2-yd Loader?*

. . . Simply when it operates over or under carrying capacity. The right combination to peak production and longer loader life is the right size bucket on the right size loader.

That's why Allis-Chalmers offers a wide selection of buckets for each of the TL-14, TL-16 and TL-20 TRACTOLOADERS. You choose the size that's just right for the weight of materials you handle and your job operating conditions.

## Some buckets are too big . . . others too small

Using a bucket that's too big for the material you handle can cause excessive repairs and downtime . . . using one that's too small costs you money because you're not getting all you can out of your loader. That's why you should select your bucket/loader by carry capacity. For example, with the TL-20 which has a 9,000-lb carry capacity, you could use a 3-yd bucket in materials that weigh 3,000 lb. You could use a 5-yd bucket with materials that weigh 1,800 lb.



## Fit the bucket to the job

Whether you're working good, level terrain, swampy ground or hilly country, there's a right loader and bucket combination for your material needs . . . your operating conditions. Choose from 17 bucket/loader combinations.

## BOTH *loader and bucket* have to be tough

. . . or the most efficient selecting in the world won't help! That's why Allis-Chalmers offers such outstanding features as extra-high spill guards . . . double-bottom bucket and replaceable wear plates — why TRACTOLOADER axles are pin-connected directly to the frame with 2-inch-diameter steel pins instead of the usual U-bolt method. There is no rolling or shifting under load — no bolts to work loose, no mounting plates to warp out of shape.

Your Allis-Chalmers construction machinery dealer can assure you longer loader life . . . more consistent production year after year than anyone else. His products are by-products of experience — backed by first-line quality parts and good service.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

TL-14 — 6 buckets
from 1 to 3 cu yd • 86 hp gasoline
83 hp diesel • 14,850 lb
TL-16 — 5 buckets
from 1½ to 4 cu yd • 109 hp gasoline
104 hp diesel • 18,000 lb
TL-20 — 6 buckets
from 2¼ to 5 cu yd
130 hp diesel • 23,250 lb

**move ahead with ALLIS-CHALMERS**

**...power for a growing world**

*Enter 1416 on Reader Card*

## 1960 truck line promises improved suspension system

IMPRESSIVE ADVANCES in ride, handling, durability and safety through an exclusive and revolutionary suspension system lead an imposing list of improvements in this recently announced 1960 truck line. The suspension design represents the nearest approach to passenger car ride and handling yet achieved in any but dual-purpose trucks.

In a clean break with the past, the maker pioneers independent front wheel suspension with ball joints and torsion rod springs on all but two series. Also an innovation is coil spring rear suspension on most one-half and three-quarter ton models.

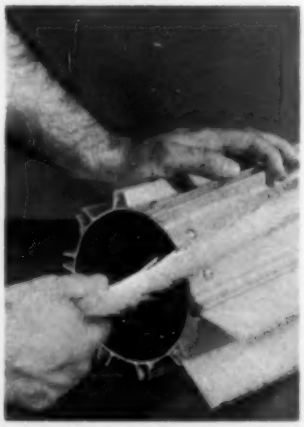
Twelve transmissions are available in the 1960 line. A two-speed Powerglide fully automatic transmission replaces Hydramatic as optional equipment on one-half and three-quarter ton conventional models. Hydramatic is retained as an option on forward-control models. Use of the improved Powermatic on larger units is continued and availability of five-speed manual transmissions is extended. *Chevrolet Motor Div., General Motors Corp., Detroit 2, Mich.* **Enter 313 on Reader Card**

## Carry-back problem solved by conveyor belt brush

NEW ADVANCES in technology during the past year has permitted the development of a low cost and efficient brush for preventing carry-back on belt from conveyors. This new brush, the Rota-Master, uses an extruded aluminum mounting with a new synthetic bristle material called Korfil "P". This material has inherent qualities that provide fast, thorough cleaning action and longer wear life than any synthetic on the market.

Korfil P does not absorb moisture. It does not soften nor does it become brittle with extremely low temperatures and it is an extremely rugged material performing excellently on wet and abrasive materials.

According to the maker, the new brush is the best available tool for solving the carry-back problem, since it will sweep the belt clean without injuring the belt surface. The brush has a built-in self-cleaning feature through its use of individual strip brush inserts.



Consequently, the unique brushing action developed permits this brush to remove 80 to 100 percent of the carry-back on a belt. *The Osborn Mfg. Co., Cleveland, Ohio*

**Enter 314 on Reader Card**

## Pelletizing equipment

PRODUCTION OF A STANDARD line of pelletizing or mixing discs for continuous agglomeration and mixing of a wide variety of fine granular solids has been announced. The Lurgi-designed discs will be made in four basic sizes —3-ft. 3-in. diam., 8½-ft. diam., 12-ft. diam. and 16½-ft. diam.

The discs are equally effective for either pelletizing or mixing. They are used extensively in the steel and mining industries for the agglomeration of ore concentrates. When employed for mixing, the discs are run at substantially higher speeds and thus can handle large volumes of material in relatively short times.

Among materials successfully pelletized in the Dravo Research Center have been common salt, molybdenum trioxide, ammonium sulphate, phosphate rock fines, zinc oxides, aluminum oxides, cement rock, and lime and coal mixtures used in the preparation of calcium carbide. Experience indicates that most fine materials can be pelletized to any size from 1/16 in. to 1½ in. The disc thus affords a means of reclaiming dust, sludges and other fine material that may have been wasted in the past.

Laboratory tests and performance in actual applications indicate that the disc attains a given homogeneity of mixture with significantly less retention time than conventional batch or continuous mixers. Since retention time is readily controlled by changing the disc's speed of rotation and angle, it is possible to employ standard sizes units to meet a wide variety of production requirements. *Dravo Corp., Neville Island, Pittsburgh 25, Pa.*

**Enter 315 on Reader Card**

## Gear reducer with bracket

A LINE OF STANDARD gear reducers is now available with bracket to mount a separate, coupling-connected standard NEMA motor. These new reducers are available for horizontal foot mounted application, in either double or triple reduction units. Double reduction units have a horsepower range of 1 through 125 hp., while triple reduction units range from 1 to 50 hp.

The motor mounting bracket on the reducer is designed to accommodate a matching motor of suitable frame, speed and horsepower. Mounting stresses cannot affect shaft alignment. Extra capacity bearings supported in a housing of great rigidity and strength make high overhung load rating possible. *The Lima Electric Motor Co., Inc., Dept. 205, Lima, Ohio*

**Enter 316 on Reader Card**

*(Continued on page 184)*

# The Standard of Comparison for FINE GRAIN STRUCTURE

You can see, even without magnification, the finer, denser grain structure of Sheffield Moly-Cop balls. The uniformity, hardness and toughness of this grain structure extend to the very core of the ball. It's the standard of comparison in grinding ball performance tests. And a big reason why you'll get longer service, less down-time, and other important production economies with Sheffield Moly-Cop Grinding Balls.

New steels are born at Armco

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ARMCO STEEL CORPORATION

OTHER DIVISIONS AND SUBSIDIARIES: Armco Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products

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# QUICK-CHANGE "ARTISTS" LOVE THAT "TELLTALE" PUMP

**NEW Type D-T Heavy-Duty "TELLTALE" Centrifugal Sand and Gravel PUMP**

CHANGING TIME, depending on the men: 6" impeller, 1 to 1½ hours; 8", 2½ to 3 hours. —6" impeller, shell liner and both faceplate liners, 2½ to 3½ hours; 8", 5 to 8 hours. It's the simple, foolproof assembly that is "Telltale's" own.

**AS LOW IN DOWNTIME AS IT IS HIGH IN PRODUCTION**

"Telltale" is the only pump that warns when it's time to reline. Air sucked through periphery ports causes pump to lose its prime. Pumping stops. Water leaking through the ports signals that the shell liner and the surrounding belt of packing have worn through.

Available with either tough semi-steel or best-in-the-long-run Ni-Hard wearing parts in 4", 6", 8", 6 x 8" suction and 8 x 10" suction. Now available also in either alloy, 45 and 90° extra-heavy long-radius flanged elbows. Write for Type D-T Heavy-Duty folder and prices.

**PEKOR IRON WORKS, INC.**

*ESTABLISHED 1892*

LOCK DRAWER 909 FAIRFAX 2-4020 COLUMBUS, GEORGIA

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**GAYCO**

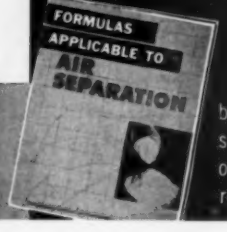
**CENTRIFUGAL AIR SEPARATORS**

Classify practically all dry fine materials

You get:

- CLOSER SEPARATIONS
- IMPROVED PRODUCTION
- NO UNDESIRABLE OVERSIZE.

RANGE 60 to 400 mesh. Timken bearings. Choice of Standard or Heavy-Duty Models.




this helpful booklet sent on request

Robert M. Gay Division

**UNIVERSAL ROAD MACHINERY CO.**

117 Liberty St., New York 6, N. Y.

Factory and Laboratory: Kingston, N. Y.

In Canada: Watson-Jack Hopkins Ltd., Montreal

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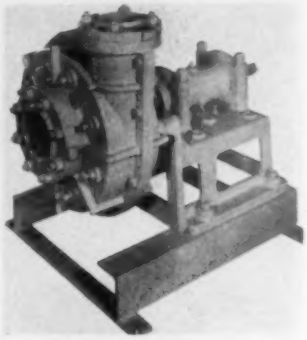
*(Continued from page 182)*



## Ceramic-lined pump

A NEW CERAMIC-LINED sand and gravel pump that is highly resistant to abrasion has just been introduced. Designated Model RXA, the new pump has been designed primarily to lengthen the service life of pumps handling fine slurries and abrasive materials in suspension. Volume is in the range of 150 gpm. at 110-ft. head, 600 gpm. at 70-ft. head.

Offering the ultimate in wear resistance with ceramic lining of bonded silicon carbide wear parts, the RXA will operate as long as two years without major repairs to the shell or impeller. The new design has been proven with several years of exhaustive tests on a wide variety of materials. Cost of the new pump is comparable with alloyed iron or rubber lined pumps. *The Kansas City Hay Press Co., 801 Woodswether Road, Kansas City 6, Mo.* **Enter 317 on Reader Card**

## New drill

A NEW DEVELOPMENT in blasthole drilling has been introduced. The 450 DR drill features a new dual rotation system which eliminates the need for conventional rifle-bar-actuated reverse rotation and adds additional power to permit faster drilling in the roughest formations.

Dual rotation is provided by a vane type air motor, connected to the drill chuck and controlled independently of the standard rifle bar rotation. Because of its independent operation there is no hammering of the drill steels during coupling or uncoupling. Stuck steels are practically eliminated and maintenance costs are slashed on drill steels, pawls, rotation parts, and couplings, according to the maker. *Joy Mfg. Co., Oliver Bldg., Pittsburgh 22, Pennsylvania* **Enter 318 on Reader Card**

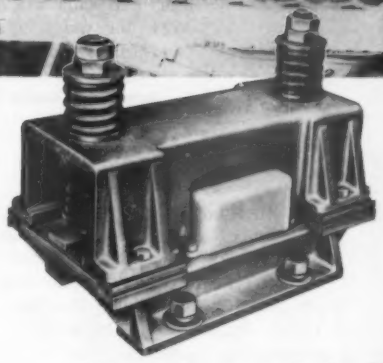
*(Continued on page 186)*

SYNTRON

*Pulsating Magnet*

# BIN VIBRATORS

vibrator on rock aggregate bins



## reduce production costs—

## Keep materials flowing freely

SYNTRON Electromagnetic Bin Vibrators have many applications in the sand, gravel, aggregate and heavy stone industry. They are primarily used to agitate materials in bins, hoppers and chutes to prevent arching and plugging and keep them flowing freely to process equipment.

SYNTRON BIN Vibrators are electromagnetic units (3600 instantly controlled vibrations per minute) that will move the most stubborn materials—eliminate damaging and hazardous pounding and rodding. Simplicity of design assures dependability of operation and low maintenance.

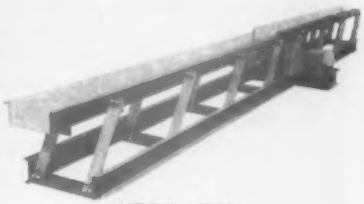
SYNTRON Bin Vibrators provide the most efficient and effective method of keeping bulk material on the move. Available in sizes for every operation large or small. Easy to install, operate and maintain.

If you are troubled by production slow downs due to sticking material call SYNTRON or—

*Write for detailed information on SYNTRON Bin Vibrators*

## Other SYNTRON Equipment of proven dependable Quality

VIBRATORY PACKERS & JOLTERS



MECHANICAL VIBRATING CONVEYORS

ROTARY VIBRATOR CAR SHAKERS

DRY FEEDER MACHINES

TEST SIEVE SHAKERS

**SYNTRON COMPANY**

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# ANALYZE FOR $Na_2O$ or $K_2O$ WITH ACCURACY IN ONE MINUTE

In analyses for alkalies, such as sodium and potassium oxides under ASTM Spec. C114-51T, the Perkin-Elmer Model 146 Flame Photometer delivers reliable results. Internal standard or direct-intensity reading from AC drift-free electronics gives fast routine analyses, accurate to within one percent.

The Model 146 operates with any commercially-available gas and air, is designed for simplified, convenient operation. It uses regular electric utilities, and includes rugged self-contained meter and phototube circuits.

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INSTRUMENT DIVISION
Perkin-Elmer Corporation
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# THERE IS THE RIGHT BIT FOR YOU OUT OF THE MANY POSSIBLE COMBINATIONS OF SIZES AND TYPES

Write today . . . giving all information you can provide. Out of the many combinations possible with four matrices, several stone size ranges, three grades of diamonds, and various face contours we will recommend the bit we believe to be the best suited for your drilling conditions.

Always specify Sprague & Henwood "Oriented" Diamond Bits. They are described and illustrated in Bulletin 320-1.

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**SCRANTON 2, PA.**
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*Enter 1451 on Reader Card*

## NEW MACHINERY

*(Continued from page 184)*

### Pulley lagging

CONVEYOR PULLEY lagging is now available in 2 and 4 in. widths in 96-ft. rolls. The material has an adhesive backing which sticks at a touch to make application fast, clean and positive. The pressure-sensitive adhesive known as "Scotch-Lag" is protected by a liner until ready for use. Most installations can be made on-the-job without removing the pulley or roll.

Face of the lagging strip is composed of resilient particles which offer non-abrasive traction without damaging the belt—in fact, it will increase belt life. It also increases the life of rolls and pulleys, and cuts machine maintenance costs, the manufacturer claims. *Minnesota Mining and Mfg. Co., 900 Bush Ave., St. Paul 6, Minn.*

***Enter 319 on Reader Card***

### Protective sheeting

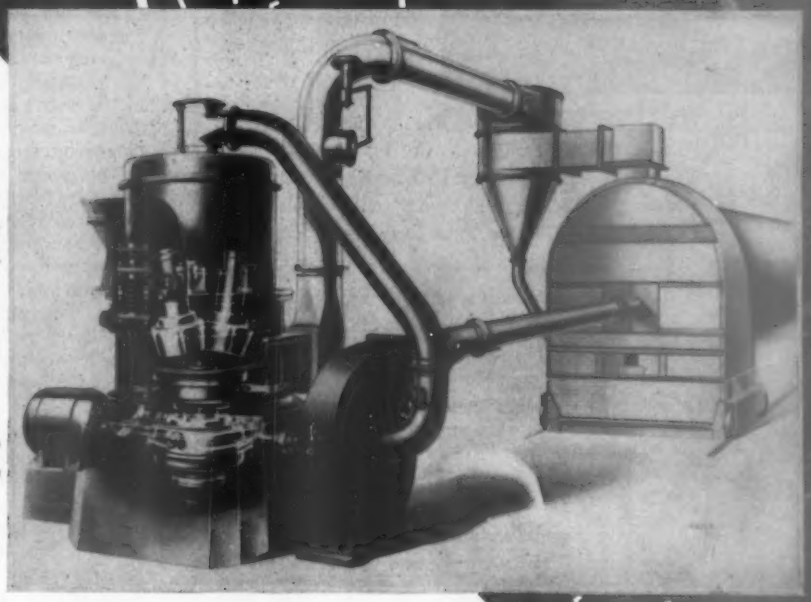
A NEW ABRASION-RESISTANT, adhesive rubber sheeting for do-it-yourself covering of chutes and hoppers or patching of conveyor belt surfaces is announced. Known as Armorline, the highly abrasion-resistant material can be applied to metal, concrete, wood and other materials almost as easily as a cold patch to an old-fashioned inner tube. A thin gauge of tacky rubber is bonded to the bottom side of the material, protected by Holland cloth which is removed before use. Neither expensive tools nor special skill are required for covering or patching equipment in the field.

Armorline is recommended by the maker for use as a covering to protect against abrasion of chutes, launders, hoppers and spouts. The material is made from a rubber compound that outwears steel of the same thickness 10 to 1 in abrasive service.

The material comes in rolls 50 or 75 ft. long, depending on the gauge of the material, and 48 in. wide. Gauges are 1/16, ⅛ and ¼ in. When thickness above ¼ in. is needed, Armorline can be applied, ply by ply, to build up to the required gauge. *The B. F. Goodrich Co., Akron, Ohio*

***Enter 320 on Reader Card***

*(Continued on page 188)*



# RAYMOND BOWL MILL . . .

## . . . for the 24-Hour DAY

Today's pressures for higher production in the nonmetallics industry can only be met by the use of machines capable of continuous trouble-free operation.

For direct-firing rotary kilns in lime and cement plants, the time-proved Bowl Mill answers all requirements. It is specially designed and built for non-stop service . . . 24 hours per day and for months at a time without shutdowns. It may be lubricated and adjusted, including compensation for wear on the rolls, while in operation.

Equally important . . . the Bowl Mill can handle coals of any grade or moisture content . . . high availability and wide range capacity . . . constant fineness of grind and proper air-coal mixture to burner for top kiln efficiency.

For today's emergency and tomorrow's economy, change to Raymond Bowl Mill firing . . . write for further details.

Write for
**RAYMOND BOWL MILL**
Catalog
No. 75

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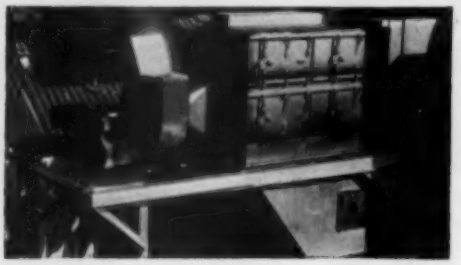

Barely visible discharge from exhauster in this unretouched photo shows how Dustex Miniature Cyclone Collector ended a problem for Perlite Products Co.—while recovering 70 lbs./hr. with no maintenance.

**"95% PREDICTED EFFICIENCY PROVED . . .**

**and Collector is maintenance-free!" . . . at Perlite Products Company**

Frank W. Shaffer, President of Perlite Products Co., Primos, Pa., writes this about his Dustex Miniature Cyclone Collector purchased on a basis of the Dustex Single Tube Determination test:

"Your predicted efficiencies of 95% are proven . . . collecting 70 lbs./hr. of 85% below-325-mesh material at 450°F . . . complaints on discharge are ended, and the collector is maintenance-free."

*Write Today* for Dustex Bulletin "A Simplified Test Method" describing actual collection test at your plant at no obligation.

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**CONCENCO® Spray Nozzles**

**Are Simple, Efficient, Economical**

When you have a material washing or spraying operation, inexpensive CONCENCO Spray Nozzles are easy to install. They deliver an excellent spray pattern, either in an unbroken sheet stream of good body, or staggered as you wish. To install, you simply drill one oversize hole per nozzle, clamp on, align and get results. Machined orifices assure effective, uniform spray.

Send for full information.

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**WHAT ARE YOU PAYING FOR REPAIRS?**

The money you are paying to keep worn-out equipment working may be just enough for you to own better equipment.

*See the* **"WHERE TO BUY"** *Section*


## NEW MACHINERY

*(Continued from page 186)*

### New spray nozzle

A NEW SPRAY NOZZLE with a scientifically designed long-life orifice has been introduced.

The new Quik-Clamp spray nozzle is made of hard cast manganese bronze to resist abrasive wear. It has a machined taper on the outside diameter of the nozzle so that it fits snugly into the hole which has been drilled and taper-reamed in the pipe.

The nozzle has a higher hydraulic efficiency than a plain hole in a header pipe. It is not necessary to replace the entire header when corrosion or wear has opened up the orifice. A bronze U-clamp and cam firmly lock the nozzle into place. Quik-Clamp spray nozzles fit pipe diameters of 2, 2½ and 3 in. *Link-Belt Co., Prudential Plaza, Chicago 1, Ill.*

**Enter 321 on Reader Card**

### Flexible boots

NEOPRENE-BASED MATERIALS are now used to fabricate flexible connections between bins and feeders, chutes and belt conveyors. Other materials handling applications where flexible, leakproof connections are necessary can be supplied. Flanged collars on the flexible connections are matched to steel flanges on the stationary equipment. Metal locking plates clamp the collar flanges to form durable joints between the units.

Vapor-tight or waterproof sealing can be achieved by coating and vulcanizing the flange joints. Fiberglas materials are available for applications involving hot or corrosive materials. *A & A Mfg. Co., Inc., 712 So. 12th St., Milwaukee 4, Wis.*

**Enter 322 on Reader Card**

### Extra strong pulley

DIE FORMING of this crown faced welded steel belt conveyor pulley gives it exceptional strength and dimensional accuracy. Forming the crowned rim in a hydraulic press at pressures up to 4,000 psi. assures that eccentricity is held within .03 in. while maintaining a taper of ⅛ in. per ft. This process makes the finished pulley 25 percent stronger than regular line welded steel conveyor pulleys. At the same time, crown welds and internal reinforcing discs have been eliminated. The new pulleys are available in diameters from 6 to 30 in. and in face widths from 12 to 66 in. *Link Belt Co., Dept. PR, Prudential Plaza, Chicago 1, Ill.* **Enter 323 on Reader Card**

# Your new plant or expansion idea

**Raw materials available?**

**Market available?**

**Location correct?**

**Capacity adequate?**

**Readily financed?**

**Right time to build?**

Kaiser Engineers specializes in the design and construction of major facilities used throughout the Minerals industry, and has world-wide experience in design of such facilities.

Among KE's most valued services are sound, searching, economic analyses, feasibility studies and site and market evaluations. In a word—*Pre-Engineering*—impartial, outside analysis which helps you decide whether to proceed with, defer or modify the project.

Kaiser Engineers offers you cost-saving, time-saving one-company service from concept through start-up.

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• KE projects include work in Australia, Brazil, Ghana, India, New Zealand, as well as Canada and the United States. Assignments include iron ore concentrating plants, cement plants, bauxite and alumina processing plants and diatomaceous earth facilities.

5459-M

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# MANUFACTURERS NEWS

## LeTourneau wins Defense Transport Award

ROBERT G. LETOURNEAU, president of R. G. LeTourneau, Inc., Longview, Tex., was to receive on October 14 the 1959 National Defense Transportation Association's Award. It is given to the man "whose achievement contributed most to the effectiveness of the transportation industry in support of national security."

Mr. LeTourneau's achievements in materials handling and transportation are sharply split into two phases. The first, which ended in 1953 when he sold his earthmoving equipment business, saw him build his small job-shop

operation of the 1920s into the world's largest maker of earthmoving equipment by World War II. During that war, his firm supplied roughly 70 percent of this type of equipment used by U. S. armed forces.

Since 1953, Mr. LeTourneau has developed his Electric Wheel, a self-contained power package with integral electric motor and gear reduction. Central to all the equipment his firm makes, it powers a new Army Snow Train and other equipment designed for the Department of Defense. The Train has 16 of the world's largest rubber tires (10 ft. high), will work north of the Arctic Circle in temperatures of 65 degrees below zero.

## Gardner-Denver joins "500"—celebrates 100th birthday

GARDNER-DENVER CO., Quincy, Ill., celebrated its centennial in August. It marked the end of a century in which the firm became one of the top makers of rock drilling equipment. The 13-plant firm made *Fortune's* list of the 500 biggest industrials by 1956, had sales of $63 million last year.

Gardner-Denver started in Quincy as the Gardner Governor Co., which made an early governor for the steam engines then becoming popular. The device prevented the engines from running away due to lack of speed control, when not under load. After the turn of the century, a combination of the firm's air compressors with a new air-powered hard rock drill became a hit. Denver Rock Drill Manufacturing Co. became a leader in this field, soon used Gardner compressors almost exclusively. In 1927 the two firms merged. Gardner-Denver pioneered such drilling improvements as air-water flushing of drill holes.

The photo, taken about 1915, shows a then-new Gardner compressor powering a Denver Rock Drill. Drill productivity has risen a bit since, and the diameter of holes has increased!

## Holloway heads sales of A-C construction equipment group

V. M. HOLLOWAY has been appointed to the new post of general sales manager of the Construction Machinery Division, Allis-Chalmers Manufacturing Co. Since World War II, Mr. Holloway has been Northwest territory industrial sales manager, and then assistant sales manager, Construction Machinery Division.

A. E. Dorn, who had been sales manager for the Division, takes over the new post of manager of sales training. His headquarters will be at the firm's Springfield (Ill.) Works.

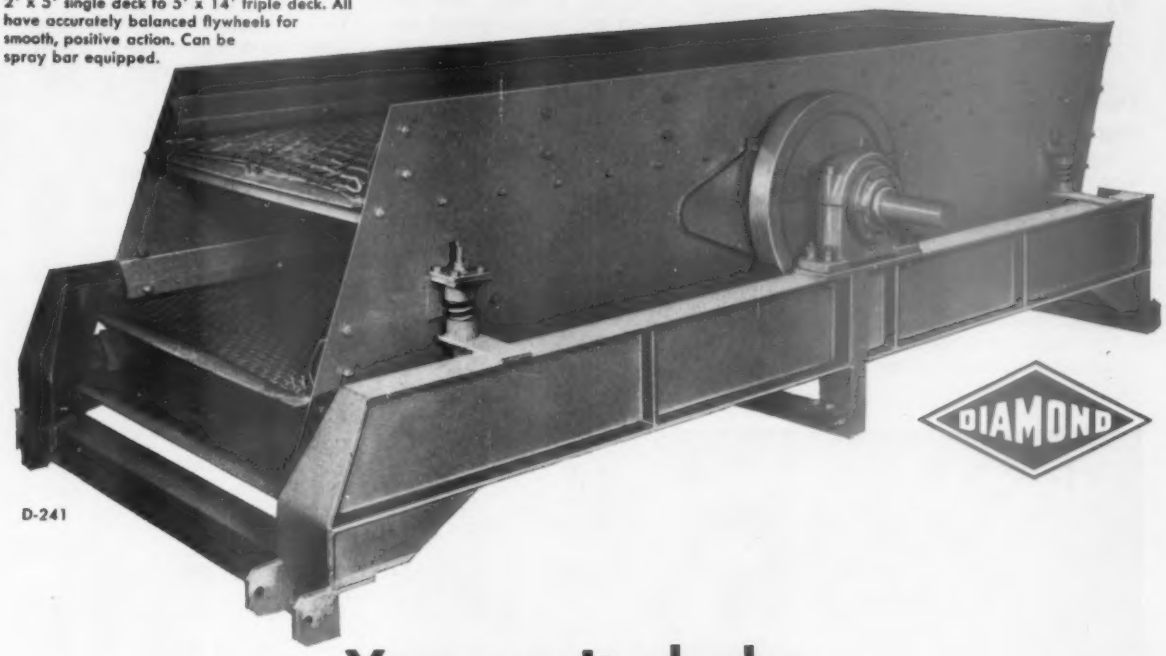
New assistant general sales manager is J. M. Haile, who has been assistant sales manager of the Division. Previous posts include assistant allied equipment sales manager, Eastern territory industrial sales manager, and in 1957, assistant sales manager of the Division.

## Simplicity appointment

ROBERT J. EHRHART has been appointed to the sales engineering staff of Simplicity Engineering Co., Durand, Mich. Mr. Ehrhart has served on the Parts and Service staff of the Buick Motor Division since July, 1957.

*(Continued on page 192)*

Diamond vibrating screens are available in sizes from 2' x 5' single deck to 5' x 14' triple deck. All have accurately balanced flywheels for smooth, positive action. Can be spray bar equipped.




D-241

# You can't choke a Diamond BALANCED Vibrating Screen!

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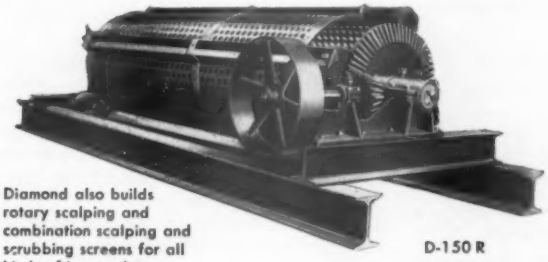
You can choose your Diamond BALANCED vibrating screen from a variety of sizes and capacities. Reinforced side plates are standard, shackle or cable suspension mountings optional.

Every day, more and more companies are benefiting from the efficiencies and economies of Diamond BALANCED vibrating screens. Get full details today.



Diamond also builds rotary scalping and combination scalping and scrubbing screens for all kinds of heavy duty.

D-150 R

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*(Continued from page 190)*

## Sturm & Brett form engineering firm

EDWARD STURM and Willis H. Brett have announced the formation of Sturm & Brett Engineers, Inc., 222 W. Adams St., Chicago 6, Ill. The consulting engineering firm, formed in July, will specialize in design project work for the aggregate, concrete and other industries.

Mr. Sturm was with International Minerals & Chemical Corp. in engineering posts for 14 years, and has spent the past five years in project engineering and management work with the Vern E. Alden Co., Chicago. Mr. Brett was with Barber-Greene Co. of Aurora, Ill., for 18 years, and most recently was employed by Western Knapp Engineering Co., Chicago, project design firm.

## New sales manager

THE CHASE BAG CO., New York, N.Y., has appointed Eugene P. Alexander sales manager of its Paper Bag Division, with headquarters in New York. William J. Gosney, sales representative for the company in Chicago, succeeds Mr. Alexander as manager of that office.

## Rolf named president of Pioneer Engineering

CARL R. ROLF is new president of Pioneer Engineering, Division of Poor & Co. With Pioneer and a predecessor since 1922, Mr. Rolf most recently was executive vice president. He succeeds Oscar J. Ellertson, who resigned

as president to devote full time to his job as vice president of the parent firm, headquartered in Chicago. Besides Pioneer, Poor has divisions making railroad, highway construction and mining equipment.

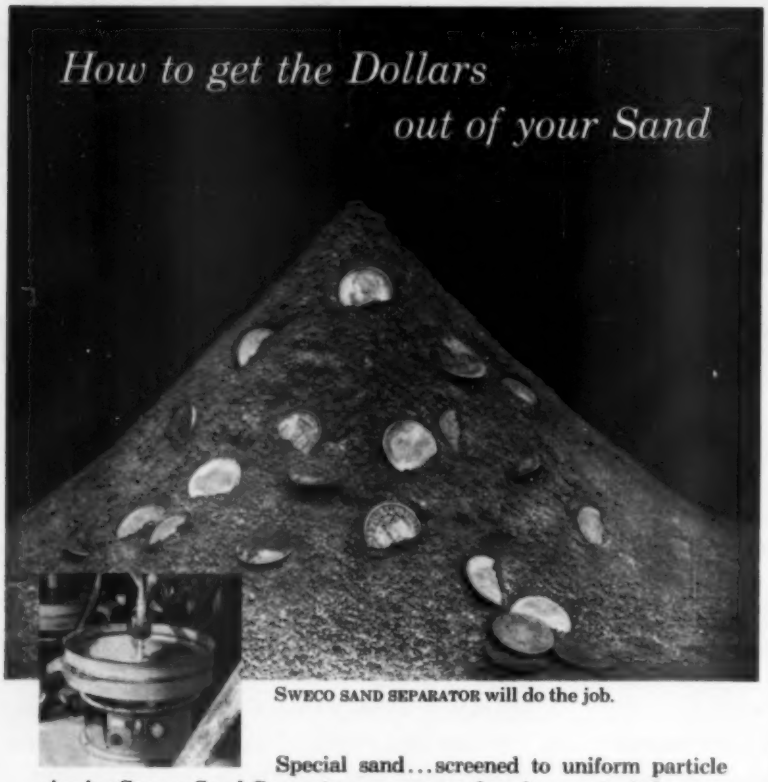
Mr. Rolf was first an employe of the Russell Grader Manufacturing Co., and joined Pioneer in 1928 when it was formed to take over part of Russell's business. Poor purchased Pioneer in 1950.

Mr. Rolf served as Pioneer's district manager of midwestern states, assistant sales manager and vice president in charge of sales before being named executive vice president.

## Traylor Engineering to be managed by Fuller

THE CONCLUSION OF the purchase of Traylor Engineering & Manufacturing Co., Allentown, Pa., by an exchange of stock, has been announced in a joint statement issued by Fuller Co., Catasauqua, Pa., General American Transportation Corp., Chicago, and Traylor. Fuller is a wholly-owned subsidiary of General American. Traylor will be operated under Fuller management, and personnel and facilities will otherwise remain unchanged.

*(Continued on page 194)*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Even at $162,000, the cost of wire rope is important. That's why so-so ropes can cost you more in the long run, because so-so ropes are *short run*. Royal Blue, on the other hand, is built by America's oldest manufacturer of wire rope to last, to do the job without a whimper. Here's why.

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*(Continued from page 192)*

## Hartman is new manager of Syntron Company

BYRON K. HARTMAN is new executive vice president and general manager of Syntron Co., Homer City, Pa. He has been sales manager of Link-Belt Company's Colmar plant outside Philadelphia. Syntron is a Link-Belt subsidiary.

Mr. Hartman, a member of the American Society of Civil Engineers, has been with the parent firm since 1937.

## Goree named vice president of Koehring division

EDWIN T. GOREE has been appointed vice president in charge of sales for the Koehring Division of Koehring, Co., Milwaukee, Wis. Before joining Koehring, Mr. Goree was sales manager of commercial cranes and excavators for Bucyrus-Erie Co.

## Allis-Chalmers acquisition

ALLIS-CHALMERS' acquisition of the Tractomotive Corp., Deerfield, Ill., was completed Tuesday, June 30, following approval by the Tractomotive board of directors.

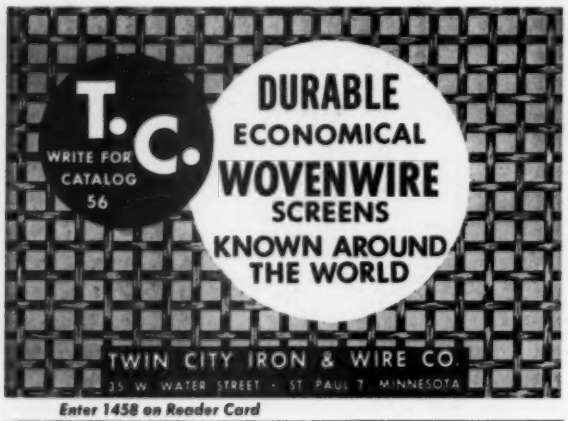
John W. Carlson, who had served as president of Tractomotive, has been named general manager of the Deerfield Works. These facilities are now part of Allis-Chalmers Construction Machinery Division, of which E. J. Mercer, a vice president of the company, is general manager.

## Dracco names Gaeckle as general manager

H. W. GAECKLE has been named vice president and general manager of Dracco Div. of Fuller Co., Cleveland. The firm makes dust control equipment and pneumatic conveyors.

Mr. Gaeckle has been with Dracco for 22 years, and has been general sales manager since 1950. He takes active control of the division from George A. Gieseler, who has been chief executive officer for the past 25 years. Mr. Gieseler will continue with the firm in a senior advisory capacity.

The firm's recently announced glass-bag dust and fume filter is being used successfully in the cement and other industries. END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# READY-MIXED CONCRETE

BY JAMES A. NICHOLSON

*James A. Nicholson, for many years the President of the Nicholson Concrete Company of Toledo, Ohio, was named President of The Toledo Plaster & Supply Company, Toledo's oldest building material firm in August, 1959.*
*Jim (as he is known in the industry) Nicholson is a graduate lawyer and first entered the concrete business in 1936 after serving six years as head football coach of the University of Toledo. Starting from scratch, after taking over a defunct building supply company, he set out to develop a ready-mixed concrete business without previous knowledge. Today he is recognized as one of the best informed men in the industry.*
*He is a past president of the Ohio Ready Mixed Concrete Association and former director of the National Ready Mixed Concrete Association. Mr. Nicholson has also spoken on a number of industry problems at different concrete quality schools held throughout the country.*
*Nicholson Concrete Company was incorporated in 1950, the business having been operated and built up previously as an individual enterprise. Four central mixing plants serve the Toledo area, and the delivery fleet consists of approximately 45 mixer trucks. The company employs 75 men and the volume of sales in ready-mixed concrete is currently at the rate of $2,000,000 annually.*

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**79 West Monroe Street**
**Chicago 3, Illinois**
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THERE ARE apparently but two ways to learn the intricacies of any business or profession. One is in the hard school of individual personal experience, which is often costly and unnecessarily discouraging. The other is a thorough understanding and intelligent use of the experience of others. When a qualified author, such as Mr. Nicholson, discusses his experience, including failures and mistakes, in an analytical and philosophical mood, the reader can profit from the recorded knowledge of another. Having once absorbed the breadth and completeness of the contents of this book, the reader should be well protected against errors of judgment that have proved so costly to many a new enterpriser. READY MIXED CONCRETE is a compilation of a series of articles on the ready-mixed concrete industry that have been published serially in CONCRETE PRODUCTS during the last several years. Now being offered for the first time in book form it is a veritable encyclopedia on ready-mixed concrete.

WE RECOMMEND Ready Mixed Concrete to all manufacturers, executives and salesmen who are interested in the production and marketing of building supply products.

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C-R 4'x14' 2 deck 25 HP motor

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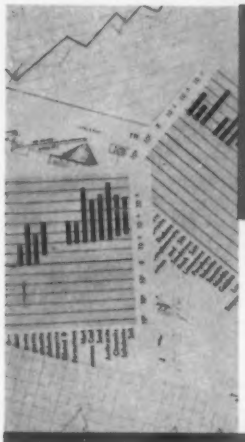

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